C21.5: 959/4

Vol. 959 Number 4

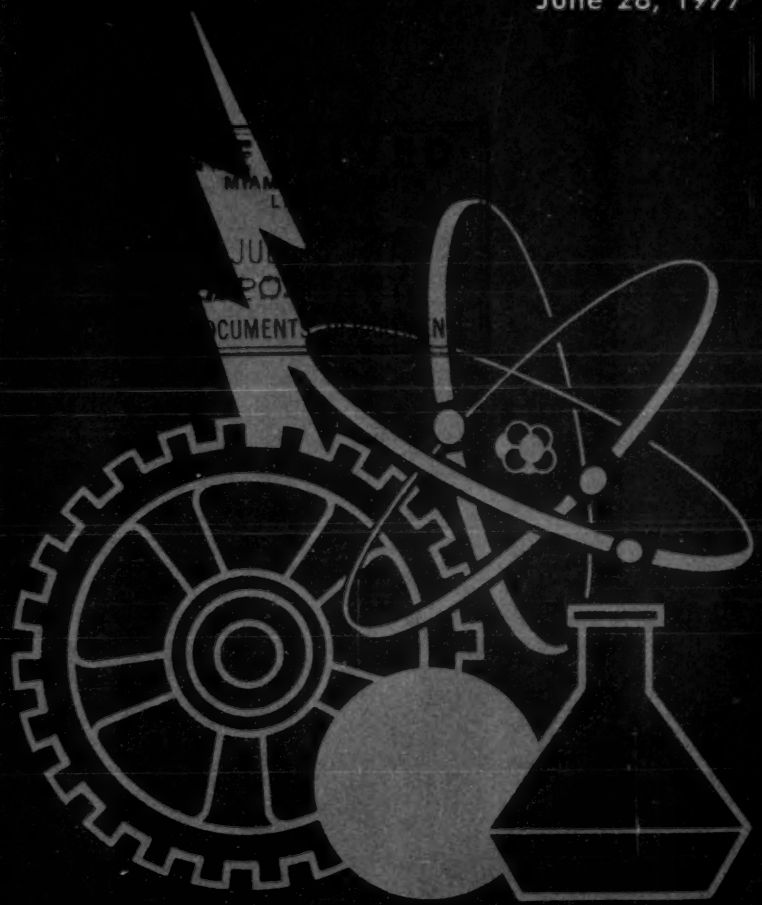
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

June 28, 1977



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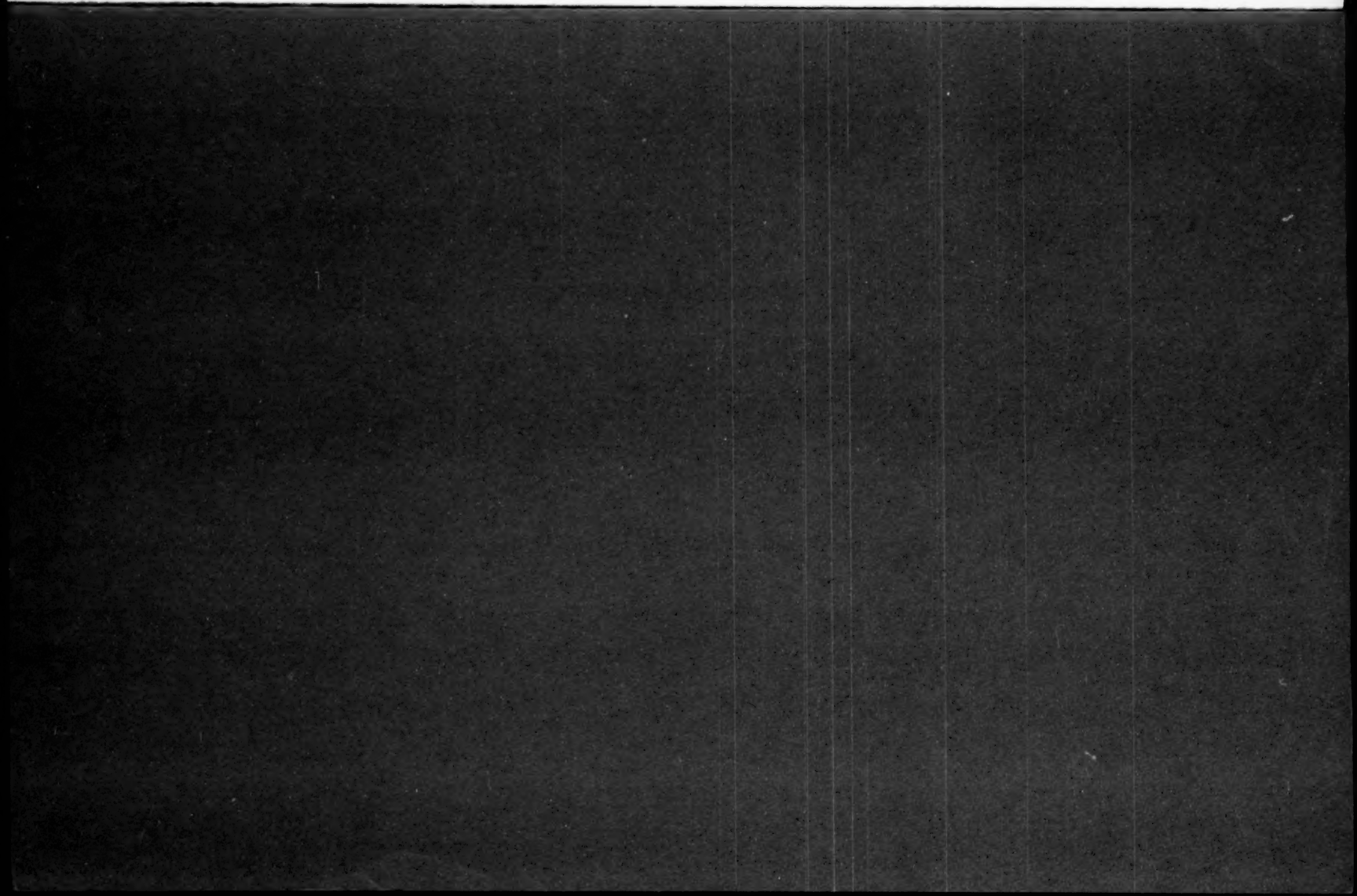

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

June 28, 1977 Volume 959 Number 4

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PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of May 1977

Affirmed	189
Affirmed in Part	28
Reversed	65
Total	282

Proposed Procedures for Recordation of Interviews

The Patent and Trademark Office is considering the adoption of the procedures set forth in the following proposed Commissioner's notice relating to the recordation of interviews in patent application files.

Current Patent and Trademark Office practices relating to the recordation of interviews with the examiner, whether in person or by telephone, are set forth in sections 1.2 and 1.133(b) of Title 37, Code of Federal Regulations and section 713.04 of the Manual of Patent Examining Procedure (MPEP).

Comments are requested on the desirability of issuing such a notice and the content thereof as well as on the desirability of amending 37 CFR 1.133(b) to provide an independent basis for the proposed interview recordation procedure. It should be noted that section 1.133(b) does not in itself support the various interview recordation requirements in effect or as proposed but must be considered in conjunction with the provisions of section 1.2.

Persons wishing to comment on the proposed procedures may do so in writing, by addressing comments to the Commissioner of Patents and Trademarks, Washington, D.C. 20231. Written comments received by August 10, 1977 will be considered before any new procedures are adopted. The contemplated notice would state that:

This notice establishes within the Patent and Trademark Office additional general procedures for the recordation of interviews.

Under present practice it is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability as set forth in section 713.04 of the Manual of Patent Examining Procedure (MPEP). This practice is continued and further amplified as set forth below.

Recent surveys have indicated that the substance of many interviews has not been made of record or the text thereof is incomplete as to substantive matters. In some cases, the substance of an interview may be presented as arguments in a subsequent response filed by the applicant but without any indication that they had been presented at the interview. In order to help insure a better record of examiner-applicant interviews in application files, the following new procedures are adopted to become effective for interviews conducted on and after ————————, 1977. Appropriate changes will be made in the Manual of Patent Examining Procedure (MPEP).

Examiners will complete a two-sheet carbon interleaf Interview Summary Form for each interview held where a matter of substance has been discussed by checking the appropriate boxes and filling in the blanks in neat handwritten form. Discussions regarding only procedural matters, directed solely to restriction requirements (for which interview recordation is otherwise provided for in Section 812.01 of the MPEP), or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below.

The Interview Summary Form shall be given an appropriate paper number, placed in the file, and listed on the "Contents" list on the file wrapper. The docket and serial register cards will not be updated to reflect this interview. In a personel interview, the duplicate copy of the Form will be removed and given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephonic interview, the copy will be mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner before an allowance is not likely or if other circumstances dictate, the Form will be mailed promptly after the telephonic interview rather than with the next official communication. The original of the complete Form will be made of record and placed in the right hand flap of the file.

The Form provides for recordation of the following information:

- — Serial Number of the application
- — Name of applicant
- — Name of examiner
- — Date of interview
- — Type of interview (personal or telephonic)
- — Name of participant(s) (applicant, attorney or agent, etc.)
- — An indication whether or not an exhibit was shown or a demonstration conducted
- — An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). (Agreements as to allowability are tentative and do not restrict further action by the examiner to the contrary)
- — The signature of the examiner who conducted the interview
- — Names of any other Patent and Trademark Office personnel present.

The Form also contains a statement reminding the applicant of his responsibility to record the substance of the interview.

It is desirable that the examiner orally remind the applicant of his obligation to record the substance of the interview in *each case* unless both applicant and examiner agree that the examiner will record same. Where the examiner agrees to record the substance of the interview, or when it is adequately recorded on the Form or in an attachment to the Form, the examiner will check a box at the bottom of the Form informing the applicant that he need not supplement the Form by submitting a separate record of the substance of the interview.

It should be noted, however, that the Interview Summary Form will not be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview:

The complete and proper recordation of the substance of any interview should include at least the following applicable items:

1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner. The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he feels were or might be persuasive to the examiner,
6) an indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete or accurate, the examiner will take appropriate action as set forth in MPEP section 713.04. If the record is complete and accurate, the examiner should place the indication "Interview record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Questions and requests for further information concerning the above-proposed notice and procedure may be directed to Mr. Louis O. Maassel by telephone at (703) 557-3070, or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

June 2, 1977. C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

April and May 1977 Classification Orders

The reclassifications covered by the following classification changes became effective during April and May 1977.

Classification Order	*Class*	*Subclasses*
582, effective April 5, 1977:		
Abolished	29	180-199.
	75	94.
	148	34.
Established	75	228-257; 950 and 951.
	428	539.5; 544-687; and 923-941.
Position change	428	2.
583, effective May 12, 1977:		
Abolished	228	141.
Established	228	141.1; 265.
584, effective May 12, 1977:		
Abolished	280	87.
Established	280	771-780.
585, effective May 27, 1977:		
Abolished	70	146-148.
Established	70	467-489.
586, effective May 31, 1977:		
Abolished	51	8-15.
Established	51	410-430.
587, effective May 31, 1977:		
Abolished	112	218; 219; 252.
Established	112	270-302.

ALFRED C. MARMOR,
Administrator for Documentation,
June 2, 1977.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,685,536, Starkey and Ransburg, METHOD FOR ELECTROSTATICALLY COATING ARTICLES; **2,794,417,** same, APPARATUS FOR ELECTROSTATICALLY COATING ARTICLE; **2,893,893,** W. W. Crouse, METHOD AND APPARATUS FOR ELECTROSTATIC COATING; **2,893,894,** E. M. Ransburg, METHOD AND APPARATUS FOR ELECTROSTATICALLY COATING, **filed** Mar. 1, 1973, D.C., E.D. Pa. (Philadelphia) Doc. 73-471, *Ransburg Corporation* v. *R & R Metal Finishing Co., Inc.* Final judgment on consent, said patents valid and enforceable. Patents in above action were infringed upon by defendant. Both parties shall abide by an agreement dated Oct. 1, 1976, entered Oct. 22, 1976.

2,794,417. (See 2,685,536.)

2,891,375, Vandamme and Rouyer, APPARATUS FOR THE PRODUCTION OF HIGH BULK YARN; **3,165,881,** De Moncuit and Crouzet, PRODUCTION OF HIGH BULK YARNS; **3,232,037,** H. Crouzet, FALSE-TWIST SPINDLE; **3,584,450,** same, PROCESS AND DEVICE FOR THE MANUFACTURE OF TEXTURED YARNS, **filed** Feb. 1, 1977, D.C., M.D.N.C. (Greensboro) Doc. C-77-47-G, *Milliken Research Corporation and Chavanoz, S.A.* v. *Collins & Aikman Corporation.*

2,893,893. (See 2,685,536.)

2,893,894. (See 2,685,536.)

2,938,676, G. H. Magrath, TOP DRIVE SPINNING SPINDLE, **filed** Jan. 10, 1977, in the United States Court of Claims (District of Columbia) Doc. 13-77, *George H. Magrath* v. *The United States.*

3,019,444, Pollack and Finsilver, SHOWER CAP; **Reg. No. 910,954** (UMBRELLA), Beautique, **filed** Feb. 8, 1977, D.C., S.D. Fla. (Miami) Doc. 77-267-C-JLK, *Devora Finsilver and Shirley Pollack* v. *Betty Dain Creations, Inc.*

3,081,392, E. L. Warner, HIGH-FREQUENCY OVEN, **filed** Apr. 13, 1976, D.C., N.D. Ohio (Cleveland) Doc. C-76-377, *The Tappan Company* v. *Litton Industries, Inc., Litton Systems, Inc. and Schwede Appliance Village.* Stipulation and order dismissing complaint with prejudice, subject to its being reinstated on application by plaintiff, upon showing that the validity of U.S. Patent No. 3,081,392 has been sustained in *Norris Industries, Inc.* v. *The Tappan Co.*, #72-597, pending in the U.S. District Court for the Central District of California, Feb. 7, 1977.

3,103,661, W. C. Hahn, IMPULSE SYSTEMS, **filed** Feb. 9, 1977, in the United States Court of Claims (District of Columbia) Doc. 320-75, *General Electric Company* v. *The United States.* Ordered that judgment be and the same is entered for the plaintiff, Feb. 14, 1977.

3,165,881. (See 2,891,375.)

3,232,037. (See 2,891,375.)

3,296,636, B. Markwitz, BUOYANCY RING; **3,775,706,** B. Markwitz, INFLATABLE SWIMMING SUPPORTS; **Reg. No. 894,510** (BEMA), Bernhard Markwitz, **filed** Nov. 29, 1974, D.C., S.D. Fla. (Miami) Doc. 74-1557-C-JE, *Bernhard Markwitz* v. *Ronald A. Hirst, individually and doing business as Beach-Marine USA Inc.* Ordered that defendants are permanently enjoined and restrained from infringing said patents, and from further prosecuting a trademark opposition proceeding, seeking registration of the notation "Swim Floogie" or "Floogie." Defendants' counterclaim is dismissed without prejudice, Feb. 10, 1977.

3,411,256, J. S. Best, ROOF CONSTRUCTION AND METHOD THEREOF; **3,763,614,** Hyde, Chalmers and Mackie, ROOF CONSTRUCTION, **filed** Jan. 24, 1977, D.C., M.D. Fla. (Tampa) Doc. 77-0052-C-TH, *The Dow Chemical Company* v. *The Celotex Corporation.*

3,432,451, R. Kales, POLYOLEFIN-MODIFIED POLYURETHANES AND PROCESS OF MAKING SAME, **filed** Feb. 11, 1976, D.C., E.D. Wis. (Milwaukee) Doc. 76-91, *J. M. Myers Tool Company* v. *Blair Industries, Inc., etc.* Order dismissing action without prejudice by reason of the failure of the plaintiff to prosecute action, Nov. 15, 1976.

3,433,437, L. E. Bates, ROCKET PROJECTILE, **filed** Feb. 8, 1977, United States Court of Claims (District of Columbia) Doc. 82-77, *Leonard E. Bates* v. *The United States of America.*

3,445,324, Curler and Lineburg, FLEXIBLE WRAPPING MATERIAL, **filed** Mar. 22, 1976, D.C., E.D. Wis. (Milwaukee) Doc. 76-201, *Milprint, Inc.* v. *Curwood, Inc.* Decision and order granting defendant's motion to dismiss the action, Nov. 30, 1976.

3,463,651, R. Warsager, MULTICOLOR SURFACE DECORATION AND PROCESS FOR PRODUCING SAME, **filed** Apr. 9, 1975, D.C.N.J. (Newark) Doc. 75-578, *Rubin Warsager* v. *Dri-Print Foils, Inc.* Complaint dismissed Nov. 5, 1976; memorandum order dismissing the defendant's counterclaim, Feb. 10, 1977.

3,506,056, Quinones, Shackelton and Williams, BURGLAR PROOF WINDOW GRILLE, **filed** Feb. 15, 1977, D.C., S.D.N.Y., Doc. 77-C-752, *Cecil Shackelton and Carlos M. Quinones et al.* v. *J. Kaufman Iron Works, Inc. and Window Security Systems, Inc.*

3,584,450. (See 2,891,375.)

3,614,051, A. H. Shapiro, TURBO-MOLECULAR AND STATOR PUMP HAVING IMPROVED ROTOR CONSTRUCTION, **filed** June 23, 1976, D.C., N.D. Calif. (San Francisco) Doc. C76-1281 CBR. *Sargent-Welch Scientific Co.* v. *Industrial Vacuum Engineering, H. R. Smith and W. G. Patterson.* Parties agree to a final judgment on consent, dismissing without prejudice, the complaint and counterclaim under the terms and conditions set forth in said final judgment on consent, Feb. 17, 1977.

3,650,766, Y. Smadar, EXTRUDED FOOD PRODUCTS AND METHOD OF PRODUCING SAME, **filed** Oct. 14, 1976, D.C., N.D. Tex. (Dallas) Doc. CA3–76–1364–C, *DCA Food Industries Inc.* v. *Rubenstein Foods, Inc.* Order, case dismissed without prejudice, Jan. 26, 1977.

3,679,840, A. R. Maxey, HELICAL SCANNING ASSEMBLY WITH TAPE TO SCANNER REFERENCING APPARATUS, **filed** Feb. 14, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c516, *Echo Science Corporation* v. *Robert Bosch GmbH et al.*

3,737,527, D. F. Keller, WAVE DEFLECTING DEVICE FOR A SEA WALL, **filed** Feb. 7, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c400, *Franklin D. Keller and Dee-Keller Research and Development Corp.* v. *1420 Sheridan Rd. Condominium Assoc. et al.*

3,763,614. (See 3,411,256.)

3,775,788. (See 3,296,636.)

3,811,550, F. S. Ajero, APPARATUS FOR ORIENTING TAPERED ARTICLES, **filed** Dec. 9, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75–713, *Hughes Company, Inc.* v. *FMC Corporation.* Stipulation and order for dismissal, Dec. 1, 1976.

3,875,607, R. B. Rosseau, GUTTER BRUSH, **filed** Nov. 14, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75–C–669, *FMC Corp.* v. *Zarnoth Brush Works, Inc.* Case transferred to District of Kansas, Jan. 4, 1977. **Same, filed** May 12, 1976, D.C., E.D. Wis. (Milwaukee) Doc. 76–316, *FMC Corporation* v. *Zarnoth Brush Works, Inc., Jenkins Equipment Company, Inc. and Sweepstar, Inc.* Case transferred to District of Kansas, Jan. 4, 1977.

3,928,933, T. Iwamoto, HOLDING TOY, **filed** Feb. 7, 1977, D.C., S.D.N.Y., Doc. 77–C–0583, *ITI Hawaii, Inc. and Takeji Iwamoto* v. *Philip Stahl, Inc.*

3,995,030, H. Malachowski, COMPOSITION AND METHOD FOR TREATING ARTHRITIS, **filed** Aug. 2, 1976, D.C. Conn. (New Haven) Doc. B–76–222, *Henry Malachowski* v. *Robert Daniels & Company, Inc. and Generics Corp. of America.* Case is dismissed with prejudice, Feb. 15, 1977.

Reg. No. 894,510. (See 3,296,636.)

Reg. No. 910,954. (See 3,019,444.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,482,906, Re. S.N. 786,837, Filed Apr. 12, 1977, Cl. 351/160, ASPHERIC CORNEAL CONTACT LENS SERIES, David Volk, Owner of Record: *Inventor,* Attorney or Agent: George S. Baldwin, et al., Ex. Gp.: 257

3,521,420, Re. S.N. 790,921, Filed Apr. 26, 1977, Cl. 52/584, BIN PANEL CONSTRUCTION, Wayne H. Oliver, Owner of Record: *Inventor,* Attorney or Agent: John D. Gould, et al., Ex. Gp.: 354

3,763,604, Re. S.N. 787,065, Filed Apr. 13, 1977, Cl. 51/399, COATED ABRASIVE BELT JOINT, John F. Malloy, Owner of Record: *Norton Company, Troy, N.Y.,* Attorney or Agent: Oliver W. Hayes, Ex. Gp.: 323

3,791,346, Re. S.N. 801,877, Filed May 31, 1977, Cl. 119/17, RODENT HABITAT, Allan H. Willinger, et al., Owner of Record: *Metaframe Corporation, Maywood, N.J.,* Attorney or Agent: Stephen L. King, et al., Ex. Gp.: 333

3,798,209, Re. S.N. 782,294, Filed Mar. 28, 1977, Cl. 536/23, 1,2,4-TRIAZOLE NUCLEOSIDES, Joseph T. Witkowski, et al., Owner of Record: *ICN Pharmaceuticals, Inc., Pasadena, Calif.,* Attorney or Agent: Kay H. Boswell, Ex. Gp.: 124

3,803,691, Re. S.N. 790,596, Filed Apr. 25, 1977, Cl. 29/200 R, MEANS FOR MOUNTING A WORK ROLL ON A SHAFT, Karlheinz Geese, et al., Owner of Record: *Morgan Construction Company, Worcester, Mass.,* Attorney or Agent: Maurice E. Gauthier, et al., Ex. Gp.: 321

3,810,219, Re. S.N. 791,597, Filed Apr. 27, 1977, Cl. 356/206, FILM TRANSPORTING MECHANISM FOR STILL CAMERAS, Guenter Fauth, Owner of Record: *AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany,* Attorney or Agent: Michael J. Striker, et al., Ex. Gp.: 211

3,833,259, Re. S.N. 793,158, Filed May 2, 1977, Cl. 297/452, VEHICLE SEAT COMPRISING THREE FOAM LAYERS, Roscoe L. Pershing, Owner of Record: *Deere & Company, Moline, Ill.,* Attorney or Agent: H. V. Harsha, et al., Ex. Gp.: 355

3,859,961, Re. S.N. 803,321, Filed June 6, 1977, Cl. 119/15, ANIMAL PATH CONNECTING SYSTEM, Allan H. Willinger, et al., Owner of Record: *Metaframe Corporation, East Paterson, N.J.,* Attorney or Agent: Stephen L. King, et al., Ex. Gp.: 333

3,877,626, Re. S.N. 786,803, Filed Apr. 12, 1977, Cl. 225/96.5, APPARATUS FOR CUTTING A CONTINUOUS ELEMENT OF INDETERMINATE LENGTH INTO PREDETERMINED LENGTHS, William Hackemann, et al., Owner of Record: *Hasbro Development Corp., Pawtucket, R.I.,* Attorney or Agent: Harry G. Shapiro, et al., Ex. Gp.: 324

3,908,416, Re. S.N. 794,792, Filed May 9, 1977, Cl. 70/71, LATCHING DEVICE, Henry Heine, et al., Owner of Record: *Presto Lock Co., Division of Walter Kidde & Co., Inc., Elmwood Park, N.J.,* Attorney or Agent: Harry G. Shapiro, et al., Ex. Gp.: 351

3,915,854, Re. S.N. 790,290, Filed Apr. 25, 1977, Cl. 210/17, WASTEWATER TREATMENT, Wilbur N. Torpey, Owner of Record: *Autotrol Corporation, Milwaukee, Wis.,* Attorney or Agent: Thomas W. Ehrmann, et al., Ex. Gp.: 176

3,944,265, Re. S.N. 785,755, Filed Apr. 7, 1977, Cl. 285/419, EXHAUST SYSTEM CONNECTOR SEAL, John R. Hiemstra, et al., Owner of Record: *Donaldson Company, Inc., Minneapolis, Minn.,* Attorney or Agent: John D. Gould, et al., Ex. Gp.: 353

3,947,681, Re. S.N. 795,189, Filed May 9, 1977, Cl. 250/211 J, ELECTRON TUNNELING DEVICE, Ali Javan, Owner of Record: *Massachusetts Institute of Technology, Cambridge, Mass.,* Attorney or Agent: Arthur A. Smith, Jr., et al., Ex. Gp.: 252

3,983,341, Re. S.N. 790,123, Filed Apr. 22, 1977, Cl. 200/16 D, SIMPLIFIED SLIDE SWITCH, Ronald J. Stanish, Owner of Record: *AMF Incorporated, White Plains, N.Y.,* Attorney or Agent: George W. Price, et al., Ex. Gp.: 217

4,007,528, Re. S.N. 791,587, Filed Apr. 27, 1977, Cl. 32/26, HIGH SPEED BONE DRILL, John J. Shea, et al., Owner of Record: *Inventor,* Attorney or Agent: J. Warren Kinney, Jr., Ex. Gp.: 333

PATENT NOTICES

Certificates of Correction for the Week of June 28, 1977

D. 243,359	3,989,849	4,005,883	4,015,429
D. 243,659	3,989,922	4,006,119	4,015,435
3,411,732	3,992,904	4,006,259	4,015,872
3,580,879	3,993,062	4,006,408	4,015,955
3,604,984	3,993,756	4,006,430	4,016,078
3,687,878	3,994,771	4,006,446	4,016,188
3,767,813	3,997,457	4,007,127	4,016,471
3,809,599	3,997,769	4,007,191	4,016,527
3,816,363	3,997,784	4,007,304	4,016,703
3,817,668	3,998,315	4,007,351	4,016,923
3,819,352	3,998,631	4,008,050	4,017,232
3,830,670	3,998,699	4,008,133	4,017,292
3,843,624	3,999,516	4,008,231	4,017,351
3,869,942	3,999,518	4,008,281	4,017,408
3,878,110	3,999,907	4,008,285	4,017,459
3,880,313	4,000,058	4,009,009	4,017,572
3,883,251	4,000,680	4,009,826	4,017,581
3,896,055	4,000,727	4,010,147	4,017,622
3,896,675	4,000,764	4,010,299	4,017,638
3,906,154	4,001,239	4,010,700	4,017,710
3,919,006	4,001,445	4,010,713	4,017,745
3,926,436	4,001,650	4,010,746	4,017,750
3,927,212	4,001,803	4,010,867	4,017,777
3,933,928	4,001,888	4,010,960	4,017,810
3,944,842	4,002,636	4,011,005	4,017,903
3,950,355	4,002,663	4,011,067	4,017,965
3,956,497	4,002,671	4,011,268	4,018,047
3,956,984	4,002,922	4,011,382	4,018,122
3,959,479	4,003,059	4,012,251	4,018,712
3,961,375	4,003,397	4,012,452	3,018,724
3,962,433	4,003,800	4,012,578	4,018,764
3,962,570	4,003,810	4,012,586	4,019,110
3,965,168	4,004,179	4,012,596	4,019,386
3,967,425	4,004,287	4,012,732	4,019,489
3,968,502	4,004,371	4,012,870	4,019,655
3,976,781	4,004,423	4,013,928	4,019,684
3,978,189	4,004,909	4,014,516	4,019,980
3,979,589	4,005,008	4,014,704	4,020,095
3,980,759	4,005,074	4,014,889	4,020,115
3,981,103	4,005,291	4,014,909	4,020,277
3,981,342	4,005,511	4,014,910	
3,987,009	4,005,651	4,015,023	

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for U.S. and possibly foreign licensing, in accordance with the policies of the agency sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications, either paper copy (PC) or microfiche (MF), can be purchased at the prices cited from the National Technical Information Service (NTIS), Springfield, Va. 22161. Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 681,018. Two-Dimensional Drawing Board Manikin. Filed Apr. 28, 1976. PC $3.50/MF $3.00.

Patent application 681,084. Digitally Tuned Parametric Amplifier. Filed Apr. 28, 1976. PC $3.50/MF $3.00.

Patent application 681,871. Lubricant Composition. Filed Apr. 30, 1976. PC $3.50/MF $3.00.

Patent application 685,841. Method for the Fabrication of Gallium Arsenide Semiconductor Devices. Filed May 13, 1976. PC $3.50/MF $3.00.

Patent application 687,285. Digital Lock-Loop Frequency Offset Correction and Display Apparatus. Filed May 17, 1976. PC $3.50/MF $3.00.

Patent application 687,581. Self Synchronizing Convolver System. Filed May 18, 1976. P.C. $3.50/MF $3.00.

Patent 3,940,892. Self-Erecting Aircraft Structure. Filed May 23, 1974. Patented Mar. 2, 1976. Not available NTIS.

Patent 3,955,169. High Power Resistor. Filed Nov. 8, 1974. Patented May 4, 1976. Not available NTIS.

Patent 3,957,083. Pressure Sensitive Regulating Valve. Filed Jan. 27, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,960,814. Poly (Perfluoroalkylene Oxide) Oxadiazoles and Their Synthesis. Filed Feb. 27, 1975. Patented June 1, 1976. Not available NTIS.

Patent 3,963,490. Dye Sensitized Dichromated Gelatin Holographic Material. Filed Sept. 23, 1974. Patented June 15, 1976. Not available NTIS.

Patent 3,965,422. System Channel Distortion Weighting for Predetection Combiners. Filed July 26, 1974. Patented June 22, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

Patent application 587,475. Target Detection Method and Apparatus for Reducing Range-Smearing Error Caused by Relative Target Motion. Filed June 16, 1975. P.C. $3.50/MF $3.00.

Patent application 680,944. Constant Current Base-Drive Circuit. Filed Apr. 28, 1976. PC $3.50/MF $3.00.

Patent application 681,087. Electrical Conducting Phthalonitrile Polymers. Filed Apr. 28, 1976. PC $3.50/MF $3.00.

Patent application 681,317. Mid-Pulse Detector. Filed Apr. 29, 1976. PC $3.50/MF $3.00.

Patent application 682,693. Bending and Cutting Tool. Filed May 3, 1976. PC $3.50/MF $3.00.

Patent application 684,506. Redundant Oscillator for Clocking Signal Source. Filed May 7, 1976. PC $3.50/MF $3.00.

Patent application 685,877. Material for Magnetic Bubble Devices. Filed May 12, 1976. PC $3.50/MF $3.00.

Patent application 689,417. Low Loss Tuneable Filter. Filed May 24, 1976. PC $3.50/MF $3.00.

Patent 3,916,229. Induction Motor for Superconducting Synchronous/Asynchronous Motor. Filed June 3, 1975. Patented Oct. 28, 1975. Not available NTIS.

Patent 3,924,262. Aural Warning Apparatus. Filed Dec. 2, 1974. Patented Dec. 2, 1975. Not available NTIS.

Patent 3,934,204. AM/AGC Weighted Diversity Combiner/Selector. Filed Oct. 4, 1974. Patented Jan. 20, 1976. Not available NTIS.

Patent 3,937,407. Multiple Strap Shock Absorber. Filed May 24, 1974. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,939,334. Closest Point of Approach Calculator. Filed Jan. 2, 1975. Patented Feb. 17, 1976. Not available NTIS.

Patent 3,940,289. Flash Melting Method for Producing New Impurity Distributions in Solids. Filed Feb. 3, 1975. Patented Feb. 24, 1976. Not available NTIS.

Patent 3,942,511. Sandwiched Structure for Production of Heat and Hydrogen Gas. Filed Sept. 19, 1974. Patented Mar. 9, 1976. Not available NTIS.

Patent 3,943,001. Silver Sulfide Cathode for Liquid Ammonia Batteries and Fuel Cells Containing Sulfur and H_2S in the Electrolyte. Filed July 5, 1973. Patented Mar. 9, 1976. Not available NTIS.

Patent 3,949,378. Computer Memory Addressing Employing Base and Index Registers. Filed Dec. 9, 1974. Patented Apr. 6, 1976. Not available NTIS.

Patent 3,952,186. Apparatus for the Generation of a Two-Dimensional Discrete Fourier Transform. Filed Feb. 10, 1975. Patented Apr. 20, 1976. Not available NTIS.

Patent 3,952,290. Read-Only Optical Memory System. Filed Nov. 11, 1974. Patented Apr. 20, 1976. Not available NTIS.

Patent 3,953,260. Gossypol, an Abundant, Low-Cost Iron Deactivator, Pot-Life Extender, and Processing Aid for HTPB Propellants. Filed May 23, 1975. Patented Apr. 27, 1976. Not available NTIS.

Patent 3,957,340. Electrooptical Amplitude Modulator. Filed Feb. 25, 1975. Patented May 18, 1976. Not available NTIS.

Patent 3,957,840. Preparation of a Ferrocenyl Compound. Filed July 15, 1974. Patented May 18, 1976. Not available NTIS.

Patent 3,958,564. EKG Contact. Filed May 9, 1975. Patented May 25, 1976. Not available NTIS.

Patent 3,963,198. Negative Air Cushion for Airship Ground Handling. Filed Apr. 2, 1975. Patented June 15, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE ARMY
Office of Judge Advocate General, Patent Division, Room 2C–455, Pentagon, Washington, D.C. 20310

Patent application 647,238. Inflatably Sealed Sterilizer Door. Filed Jan. 7, 1976. PC $3.50/MF $3.00.

Patent 3,940,474. Generation of Hydrogen. Filed Aug. 6, 1974. Patented Feb. 24, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 692,720. Method for the Complete Dissolution of Mineral Samples. Filed June 4, 1976. PC $3.50/MF $3.00.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Mgmt. Branch, General Services Division, Federal Bldg., Agricultural Research Service, Hyattsville, Md. 20782

Patent application 705,230. Wood Impingement Dryer. Filed July 14, 1976. PC $3.50/MF $3.00.

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
Assistant General Counsel for Patents, Washington, D.C. 20545

Patent 3,904,273. Apodised Aperture Using Rotation of Plane of Polarization. Filed Mar. 18, 1974. Patented Sept. 9, 1975. Not available NTIS.

Patent 3,904,985. Explosive Laser. Filed Feb. 5, 1974. Patented Sept. 9, 1975. Not available NTIS.

U.S. DEPARTMENT OF THE INTERIOR
Branch of Patents, 18th and C Streets NW., Washington, D.C. 20240

Patent application 709,990. Production of Supported Raney-Type Catalysts by Reactive Diffusion. Filed July 30, 1976. PC $3.50/MF $3.00.

Patent application 709,999. Massive Catalytic Inserts. Filed July 30, 1976. PC $3.50/MF $3.00.

Patent 3,969,452. Method for Casting and Handling Ultra Thin Reverse Osmosis Membranes. Filed Aug. 8, 1974. Patented July 13, 1976. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters, NASA Code GP–2, Washington, D.C. 20546

Patent application 706,424. Heat Resistant Polymers of Oxidized Styrylphosphine. Filed July 19, 1976. PC $4/MF $3.00.

Patent application 706,425. Power Factor Control System for AC Induction Motors. Filed July 19, 1976. PC $3.50/MF $3.00.

Patent application 707,125. TV Fatigue Crack Monitoring System. Filed July 20, 1976. PC $3.50/MF $3.00.

Patent application 708,659. Liquid Metal Slip Ring. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,771. Method of Producing Complex Aluminum Alloy Parts of High Temper, and Products Thereof. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,795. Pressure Modulating Valve. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,800. Wrist Joint Assembly. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 708,951. Polymeric Foams From Cross-Linkable Poly-N-Arylenebenzimidazoles. Filed July 26, 1976. PC $3.50/MF $3.00.

Patent application 712,419. Flow Separation Detector. Filed Aug. 6, 1976. PC $3.50/MF $3.00.

Patent 3,961,997. Fabrication of Polycrystalline Solar Cells on Low-Cost Substrates. Patented June 8, 1976. Not available NTIS.

Patent 3,971,362. Miniature Ingestible Telemeter Devices To Measure Deep-Body Temperature. Patented July 27, 1976. Not available NTIS.

Patent 3,971,363. Myocardium Wall Thickness Transducer and Measuring Method. Patented July 27, 1976. Not available NTIS.

Patent 3,971,364. Catheter Tip Force Transducer for Cardiovascular Research. Patented July 27, 1976. Not available NTIS.

Patent 3,971,602. Thrust Bearing. Patented July 27, 1976. Not available NTIS.

Patent 3,971,697. Production of I–123. Patented July 27, 1976. Not available NTIS.

Patent 3,971,703. Method of Detecting and Counting Bacteria. Patented July 27, 1976. Not available NTIS.

Patent 3,971,847. Hydrogen Rich Gas Generator. Patented July 27, 1976. Not available NTIS.

Patent 3,971,930. Polarization Compensator for Optical Communications. Patented July 27, 1976. Not available NTIS.

Patent 3,972,008. Method and Apparatus for Generating Coherent Radiation in the Ultraviolet Region and Above by Use of Distributed Feedback. Patented July 27, 1976. Not available NTIS.

Patent 3,972,038. Accelerometer Telemetry System. Patented July 27, 1976. Not available NTIS.

Patent 3,972,651. Solar-Powered Pump. Patented Aug. 3, 1976. Not available NTIS.

Patent 3,972,727. Rechargeable Battery Which Combats Shape Change of the Zinc Anode. Patented Aug. 3, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE ARMY
Office of Judge Advocate General, Patent Division, Room 2C–455, Pentagon, Washington, D.C. 20310

Patent application 571,175. Discrete Control Correction for Synchronizating Digital Networks. Filed Apr. 24, 1975, PC $4/MF $3.00.

Patent application 650,658. Glass Compositions Having Fluorescence Properties. Filed Jan. 20, 1976. PC $3.50/MF $3.00.

Patent Re. 28,621. Fluid Angular Rate Sensor. Filed July 17, 1969. Reissued Nov. 25, 1975. Not available NTIS.

Patent Re. 28,622. Fluid Angular Rate Sensor. Filed July 17, 1969. Reissued Nov. 25, 1975. Not available NTIS.

Patent 3,931,730. Ramp Current Apparatus and Method of Sensitivity Testing. Filed Dec. 23, 1974. Patented Jan. 13, 1976. Not available NTIS.

Ptaent 3,932,745. Far Field Construction for Optical Fourier Transforms. Filed Sept. 30, 1974. Patented Jan. 13, 1976. Not available NTIS.

Patent 3,933,096. Gyroscopic Rate Switch. Filed Mar. 11, 1974. Patented Jan. 20, 1976. Not available NTIS.

Patent 3,936,902. Automatic Cleaning Apparatus for Fluid Filters. Filed July 11, 1974. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,937,071. Fatigue Test Apparatus. Filed July 11, 1975. Patented Feb. 10, 1976. Not available NTIS.

Patent 3,938,378. Engine Compression Testing. Filed Aug. 26, 1974. Patented Feb. 17, 1976. Not available NTIS.

Patent 3,938,815. Chuck Having Jaw Counterbalance Mechanism. Filed Mar. 31, 1975. Patented Feb. 17, 1976. Not available NTIS.

Patent 3,942,486. Hydraulic Fan Drive System Speed Control. Filed Aug. 21, 1974. Patented Mar. 9, 1976. Not available NTIS.

Patent 3,943,741. Embossing Method. Filed Mar. 25, 1975. Patented Mar. 16, 1976. Not available NTIS.

Patent 3,943,776. Fluidic Acceleration Sensor. Filed Dec. 23, 1974. Patented Mar. 16, 1976. Not available NTIS.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 696,341. Dual Pressure Sensing Safing and Arming Mechanism. Filed June 15, 1976. PC $3.50/MF $3.00.

Patent application 696,343. N-Channel Deep Depletion Mode Semiconductor Device. Filed June 15, 1976. PC $3.50/MF $3.00.

Patent application 696,344. Intershaft Balance Weight. Filed June 15, 1976. PC $3.50/MF $3.00.

Patent application 696,345. Turbine Band Cooling System. Filed June 15, 1976. PC $3.50/MF $3.00.

Patent application 696,963. Duct Pressure Actuated Nozzle. Filed June 17, 1976. PC $3.50/MF $3.00.

Patent application 698,984. Low Power Frequency Modulated Hybrid Fiber Optic Data Acquisition System. Filed June 23, 1976. PC $3.50/MF $3.00.

Patent application 699,929. Vortex Generators in Axial Flow Compressor. Filed June 25, 1976. PC $3.50/MF $3.00.

Patent 3,969,907. Cold Cylinder Assembly for Cryogenic Refrigerator. Filed Mar. 25, 1975. Patented July 20, 1976. Not available NTIS.

Patent 3,969,978. Direct Injection Liquid Propellant Gun System. Filed Dec. 20, 1974. Patented July 20, 1976. Not available NTIS.

Patent 3,970,005. Mass Focus Explosive Layered Bomblet. Filed Jan. 25, 1969. Patented July 20, 1976. Not available NTIS.

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
Assistant General Counsel for Patents, Washington, D.C. 20545

Patent 3,904,273. Anodised Aperture Using Rotation of Plane of Polarization. Filed Mar. 18, 1974. Patented Sept. 9, 1975. Not available NTIS.

Patent 3,904,985. Explosive Laser. Filed Feb. 5, 1974. Patented Sept. 9, 1975. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Assistant General Counsel for Patent Matters, NASA Code GP–2, Washington, D.C. 20546

Patent application 712,419. Flow Separation Detector. Filed Aug. 6, 1976. PC $3.50/MF $3.00.

Patent 3,545,262. Method and Apparatus for Nondestructive Testing of Pressure Vessels. Patented Dec. 8, 1970. Not available NTIS.

Patent 3,955,941. Hydrogen Rich Gas Generator. Patented May 11, 1976. Not available NTIS.

Patent 3,971,256. Meteorid Capture Cell Construction. Patented July 27, 1976. Not available NTIS.

Patent 3,971,535. Oblique-Wing Supersonic Aircraft. Patented July 27, 1976. Not available NTIS.

Patent 3,972,008. Method and Apparatus for Generating Coherent Radiation in the Ultraviolet Region and Above by Use of Distributed Feedback. Patented July 27, 1976. Not available NTIS.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JUNE 4, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	8-4-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates: Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-17-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-9-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	8-2-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology, Acoustics; Recorders; Weighing Scales.	1-19-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	5-24-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-4-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	12-27-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-28-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-7-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	11-12-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-6-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	7-12-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-3-76

Expiration of patents: The patents within the range of numbers indicated below expire during June 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,939,145 to 2,943,326, inclusive
Plant Patents..... Numbers 1,950 to 1,956, inclusive

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,277

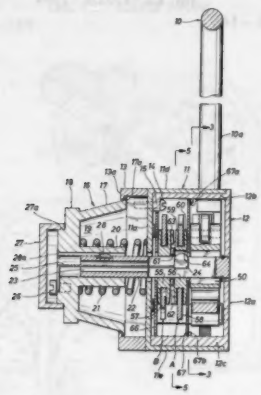
COMBINATION LOCK

Richard P. Harrington, and Russell J. Harrington, both of P.O. Box 474, Mountainburg, Ark. 72946

Original No. 3,729,962, dated May 1, 1973, Ser. No. 168,113, Aug. 2, 1971. Application for reissue Apr. 23, 1975, Ser. No. 570,557

Int. Cl.[2] E05B *37/04*

U.S. Cl. 70—25 23 Claims



1. A combination lock comprising

a shackle movable between a locked and an unlocked position;

locking means movable into and out of locking engagement with the shackle;

fence means for moving the locking means out of locking engagement with the shackle;

a plurality of tumbler wheels having peripheral gates to receive the fence means and permit the fence means to move the locking means out of locking engagement with the shackle;

a rotatable dial; and

means rotated by the dial and movable axially between a first position in driving engagement with the tumbler wheels for rotating the tumbler wheels to the desired position for the gates therein to receive the fence means, and a second position out of driving engagement with the tumbler wheels and in driving engagement with the fence means to move the fence means into the gates and move the locking means out of locking engagement with the shackle.

Re. 29,278

WASTE COMPACTING APPARATUS

Rudi Richard Vogel, Kitchener, Canada, assignor to Sargent Industries, Inc., Los Angeles, Calif.

Original No. 3,734,005, dated May 22, 1973, Ser. No. 219,032, Jan. 19, 1972. Application for reissue Apr. 25, 1975, Ser. No. 571,682

Int. Cl.[2] B30B *15/18, 15/22*

U.S. Cl. 100—52 25 Claims

9. Waste compaction apparatus, comprising

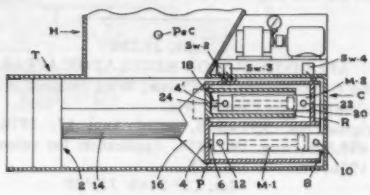
storage means for the waste,

a packer located in the storage means and movable in the storage means in a first direction to advance waste through the storage means and compact such waste during such advance of the waste through the storage means and movable in a direction opposite to the first direction;

a ram forming part of said packer and normally telescoped therein and retractably extendible therefrom in the first direction of movement of said packer, the ram having a leading end which forms a portion of that of the packer as a whole when the ram is telescoped therein;

motor means for reciprocating said packer through successive cycles of operation respectively comprising movement in the first direction for compacting the waste in the storage means and movement in the opposite direction, a standard cycle of operations commencing at a lead-off position with the ram telescoped as aforesaid and with the packer displaced from a position for compacting the waste in the storage means, and

recycling means responsive, upon mechanical stalling of the packer in the movement of a standard cycle of operations involving compacting the waste in the storage means, to initiate successive cycles of operation for advancing the waste through the storage means, said successive cycles including the termination of said movement of the packer upon the mechanical stalling of the packer; then extension of the ram from the packer in the first direction; then telescopic retraction of the ram into the packer, with the leading end of the ram forming a portion of that of the packer as a whole, upon the completion of the retractible extension of the ram from the packer or upon the exertion of a particular pressure against the ram by the waste in the storage means before the completion of the retractible extension of the ram from the packer; and then movement of the packer, with the ram in the telescoped position in the packer, in the direction for compacting the waste in the storage means.



Re. 29,279

DEVICE FOR LAUNCHING AND DOUSING LIGHT SAILS SUCH AS SPINNAKERS

Jack W. Fretwell, Jr., Millwood, Va. 22646

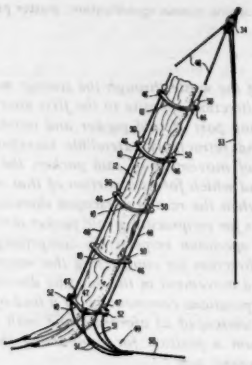
Original No. 3,861,343, dated Jan. 21, 1975, Ser. No. 430,562, Jan. 3, 1974. Application for reissue Nov. 20, 1975, Ser. No. 633,710

Int. Cl.[2] B63H *9/10*

U.S. Cl. 114—104 14 Claims

11. A device for launching a light sail connected to the mast of a sailing vessel comprising at least two rings spaced from each other along the length of said sail and encircling said sail in furled condition, each said ring being of a size which, when positioned on the sail in the furled condition, provides upwardly slideable engagement with the sail, the lowermost ring engaging the lower portions of the sail, the uppermost ring engaging the upper portions of the sail and any intermediate ring or rings engaging intermediate portions of the sail when in the furled condition to retain said sail in the furled condition and means for

raising the lowermost ring into engagement with the next ring above it to raise said next ring and successively to raise all rings



to slide said rings upwardly along said sail to disengage all rings from the sail and thereby launch the sail.

Re. 29,280

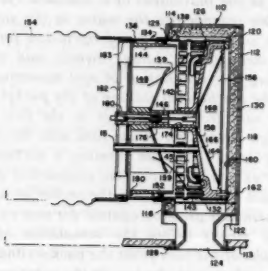
AIR DISTRIBUTION REGULATOR APPARATUS

John C. McNabney, La Crosse, Wis., assignor to The Trane Company, La Crosse, Wis.

Original No. 3,974,859, dated Aug. 17, 1976, Ser. No. 498,826, Aug. 19, 1974. Application for reissue Oct. 15, 1976, Ser. No. 732,938

Int. Cl.² F16K *31/126*

U.S. Cl. 137—625.37 **13 Claims**



1. Air distribution apparatus comprising: an air plenum chamber having front and back sheet metal walls spaced from each other; an air outlet opening from said chamber; a generally circular aperture in said sheet metal front wall, *defining an air inlet opening to said chamber*, that portion of said chamber opposite from said aperture being closed by said back wall; a generally cylindrical sleeve extending axially inward of said inlet opening and having an inner portion disposed inwardly of said inlet opening and an outer portion; retainer means for retaining said sleeve in said inlet opening; an air conveying duct separate from said front wall fastened to the radial outer surface of said outer portion of said sleeve to supply air thereto; means defining at least one first aperture at said inner portion of said sleeve extending radially outwardly communicating the interior of said sleeve with the interior of said plenum chamber; closure means at the end of said inner portion for blocking axial air flow; a generally cylindrically shaped valve disposed radially inwardly of said sleeve; mounting means for mounting said valve for axial movement within said sleeve between a first axial position [at least partially outside of said inlet opening and] substantially noncoextensive with said first aperture thereby opening said first aperture and a second axial position substantially coextensive with said first aperture thereby substantially closing said first aperture; and means for freely communicating the axial ends of said valve through said valve to thereby substantially balance the axial fluid forces exerted on said valve.

Re. 29,281

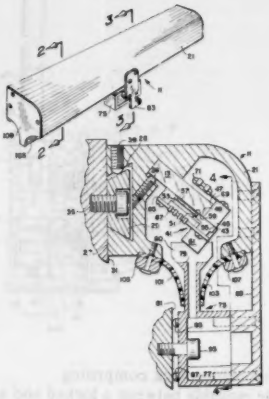
MEASURING APPARATUS USING THE MOIRE FRINGE CONCEPT OF MEASUREMENT

Richard H. Burns, Webster, and Helmut Welker, Jamestown, both of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Original No. 3,833,303, dated Sept. 3, 1974, Ser. No. 295,777, Oct. 6, 1972. Application for reissue May 19, 1975, Ser. No. 578,594

Int. Cl.² G01B *11/04*

U.S. Cl. 356—169 **11 Claims**



1. Apparatus for measuring displacement between first and second relatively movable members, said apparatus comprising:

a. a scale securable to said first member, said scale including first and second adjacent surfaces, said first scale surface being angled with respect to said second scale surface, one of said first and second scale surfaces having a given line frequency;

b. transducer means including a carriage and an index grating, said carriage including first and second adjacent scale engaging surfaces, said first scale engaging surface being angled with respect to said second scale engaging surface at substantially the same angle that said first scale surface is angled with respect to said second scale surface, said index grating being held by said carriage parallel to and spaced from [said] one of said first and second scale engaging surfaces;

c. support means securable to said second member; and

d. means for continuously maintaining said first scale engaging surface in engagement with said first scale surface and said second scale engaging surface in engagement with said second scale surface, said means for continuously maintaining being secured to one of said transducer means and said support means, said means for continuously maintaining being connected to the other of said transducer means and said support means by means which permit at least limited rotational movement in every direction, said means for continuously maintaining being rigid in a direction parallel to the direction of relative movement between said first and second members and flexible in directions transverse to said direction of movement, whereby in operation when said first member moves relative to said second member the relative spacing and alignment between said index grating and said

one of said first and second scale surfaces remains substantially constant.

Re. 29,282

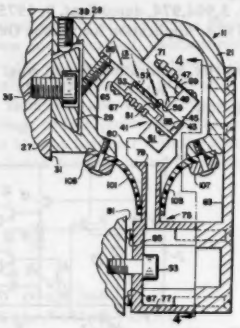
MEASURING APPARATUS USING THE MOIRE FRINGE CONCEPT OF MEASUREMENT

Richard H. Burns, Webster; Donald R. Hosack, and Helmut Welker, both of Jamestown, all of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Original No. 3,833,303, dated Sept. 3, 1974, Ser. No. 295,777, Oct. 6, 1972. Application for reissue May 19, 1975, Ser. No. 578,595

Int. Cl.² G01B *11/04*

U.S. Cl. 356—169 **1 Claim**



14. Apparatus for measuring displacement between first and second relatively movable members, said apparatus comprising:

a. a dovetail mounting member securable to said first member;

b. a spar, said spar being provided with a dovetail mounting means which cooperates with said dovetail mounting member to secure said spar to said first member;

c. a scale secured to said spar, said scale including first and second adjacent surfaces, said first scale surface being angled with respect to said second scale surface, one of said first and second scale surfaces having a given line frequency;

d. transducer means including a carriage and an index grating, said carriage including first and second adjacent scale engaging surfaces, said first scale engaging surface being angled with respect to said second scale engaging surface at substantially the same angle that said first scale surface is angled with respect to said second scale surface, said index grating being held by said carriage parallel to and spaced from one of said first and second scale engaging surfaces;

e. support means securable to said second member; and

f. means for continuously maintaining said first scale engaging surface in engagement with said first scale surface and said second scale engaging surface in engagement with said second scale surface, said means for continuously maintaining being secured to one of said transducer means and said support means, said means for continuously maintaining being connected to the other of said transducer means and said support means by means which permit at least limited rotational movement in every direction, said means for continuously maintaining being rigid in a direction parallel to the direction of relative movement between said first and second members and flexible in directions transverse to said direction of movement, whereby in operation when said first member moves relative to said second member the relative spacing and alignment between said index grating and said one of said first and second scale surfaces remains substantially constant.

Re. 29,283

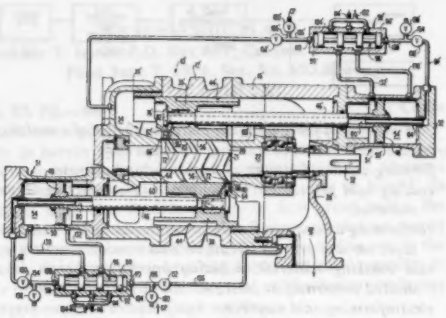
UNDERCOMPRESSION AND OVERCOMPRESSION FREE HELICAL SCREW ROTARY COMPRESSOR

David N. Shaw, Unionville, Conn., assignor to Dunham-Bush, Inc., West Hartford, Conn.

Original No. 3,936,239, dated Feb. 3, 1976, Ser. No. 492,084, July 26, 1974. Application for reissue June 2, 1976, Ser. No. 692,077

Int. Cl.² F04B *49/02*

U.S. Cl. 417—282 **16 Claims**



1. In a positive displacement rotary screw compressor of the type wherein a casing is provided with a barrel portion defined by intersecting bores with coplanar axes located between axially spaced end walls and having low pressure and high pressure ports in communication with said bores at opposite ends of said barrel portion, and helical screw rotors having grooves and lands mounted for rotation within respective bores with the lands and grooves of respective rotors intermeshed, an axially extending recess is provided within the barrel portion of the casing in open communication with the bores, and a slide valve member is axially slidable in the recess with the inner face of the slide valve member being complementary to the envelope of that portion of the bores of the casing structure confronted by the opening of the recess communicating with the bore portion of the casing structure, with the valve member in sealing relation with confronting rotors, the discharge port being located within the barrel portion of the casing structure with the valve member being movable between extreme positions, in one of which, the discharge port is fully open, and the other in which, the discharge port is closed, and wherein the valve member is of sufficient length to cover the entire remaining length of the confronting portion of the rotor structure throughout the range of movement of the valve member between its extreme positions, the improvement comprising:

means for sensing the pressure of the working fluid within a closed thread closely adjacent to the end of the slide valve member closing off the discharge port to the closed thread,

means for sensing the compressor discharge pressure of the working fluid at the discharge port, [and

means for controlling shifting of said slide valve member axially to equalize these pressures]

means for comparing said two pressures, and

means responsive to said pressure comparing means for shifting said slide valve member in a direction tending to equalize said pressures, to prevent undercompression or overcompression of the compressor working fluid within the closed thread, prior to discharge.

Re. 29,284

PROCESS FOR FORMING INTERCONNECTIONS IN A MULTILAYER CIRCUIT BOARD

Joseph M. Shaheen, La Habra, and Leo J. Quintana, Anaheim, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Original No. 3,464,855, dated Sept. 2, 1969, Ser. No. 577,438, Sept. 6, 1966. Application for reissue Nov. 6, 1970, Ser. No. 87,512

Int. Cl.² C25D *5/02*

U.S. Cl. 204—15 **3 Claims**

3. A method of fabricating an individual layer of a multilayer printed circuit board, comprising the steps of:

forming a printed circuit on an insulator substrate;

coating said printed circuit with a thin conductive layer of material;

conforming an apertured masking material to said conductive layer on said printed circuit on said insulator substrate;

said masking material including apertures therein in the desired pattern of at least one interlayer connector;

electroforming said connector using said conductive layer as an electrical path in the electroforming operation;

removing the masking material and the resultant exposed material of the conductive layer; and

insulating the printed circuit and the interlayer connector, leaving an exposed surface at the end of said interlayer connector.

Re. 29,285

METHOD FOR CONCOMITANT PARTICULATE DIAMOND DEPOSITION IN ELECTROLESS PLATING, AND THE PRODUCT THEREOF

Theodore Peter Christini, Dushore, Pa.; Albert Lawrence Eustice, Lewiston, N.Y., and Arthur Hughes Graham, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Original No. 3,936,577, dated Feb. 3, 1976, Ser. No. 341,529, Mar. 15, 1973. Continuation-in-part of Ser. No. 208,233, Dec. 15, 1971, abandoned. Application for reissue June 7, 1976, Ser. No. 694,047

Int. Cl.² B32B *15/00;* **B05D** *3/10*

U.S. Cl. 428—426 **6 Claims**

1. A coated article formed by electroless plating comprising a co-deposited uniform dispersion of diamond particles secured by substantial nucleation within a metallic matrix comprising one of the group consisting of: (1) an alloy including a metal of the sub-group made up of nickel, cobalt and mixtures thereof with one of the elements phosphorus, boron and mixtures thereof and (2) elemental copper, deposited on a supporting substrate consisting of polymer, metal, ceramic or glass.

Re. 29,286

POWER AMPLIFIER WITH A BOOTSTRAPPED DRIVER STAGE

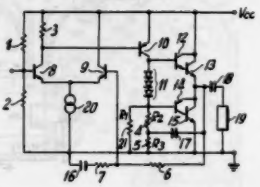
Hirokazu Fukaya, and Naotoshi Higashiyama, both of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Original No. 3,904,974, dated Sept. 9, 1975, Ser. No. 493,652, July 30, 1974. Application for reissue Oct. 4, 1976, Ser. No. 729,285

Claims priority, application Japan, Aug. 2, 1973, 48-87349

Int. Cl.² H03F *1/38*

U.S. Cl. 330—26 **3 Claims**



1. A power amplifier comprising:

a driver circuit comprising an input terminal, an output terminal, signal amplifying means and a load element formed by two separate resistors, a first end of the first resistor being connected to said signal amplifying means and a second end of said first resistor being connected to said second resistor;

an output circuit comprising at least one input terminal connected directly to the output terminal of said driver circuit, output transistors connected in a single-ended push-pull configuration, and an output terminal;

feedback means for supplying a feedback signal from the output terminal of said output circuit to said second end of said first resistor; and

a third resistor connected directly to and in parallel with said load element.

PLANT PATENTS

GRANTED JUNE 28, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,065
KALANCHOE PLANT
Lawrence T. Irwin, P.O. Box 657, Canyon, Tex. 79015
Filed June 7, 1976, Ser. No. 693,880
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe Plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of tall, upright, vigorous growth; earliness of flower; profusion of flowers carried on a sturdy stem well above the foliage; medium to large size flexible foliage of fern green color; the unique mandarin red color of its blooms together with the adaptability of photoperiod manipulation for year round flowering.

4,066
KALANCHOE PLANT
Lawrence T. Irwin, P.O. Box 657, Canyon, Tex. 79015
Filed June 7, 1976, Ser. No. 693,881
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its orange red color with a distinctive yellow eye; medium large sized flexible foliage of fern green color; its tall habit of from 16 inches to 20 inches in height; the profusion of flowers carried on sturdy stems 6 inches above the foliage; and its adaptability to year round flowering by photoperiod manipulation.

4,067
KALANCHOE PLANT
Lawrence T. Irwin, P.O. Box 657, Canyon, Tex. 79015
Filed June 7, 1976, Ser. No. 693,882
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of tall, vigorous growth habit of from 16 inches to 20 inches in height; its medium large size flexible foliage of fern green color; the profusion of unique crimson color flowers carried on sturdy stems 6 inches above the foliage; the absence of an eye in the flowers; its vigorous free breaking habit; and its adaptability to year round flowering by photoperiod manipulation producing a large pot plant from a single cutting.

4,068
KALANCHOE PLANT
Lawrence T. Irwin, P. O. Box 657, Canyon, Tex. 79015
Filed June 7, 1976, Ser. No. 693,883
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of Kalanchoe plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a tall, upright, vigorous habit, growing 16 inches to 20 inches in height; the very large flowers of about 2 cm diameter; the unique scarlet color of the flowers with a definite yellow eye (4); profusion of flowers carried on sturdy stems 4 inches to 6 inches above the foliage; the medium large size flexible foliage of fern green color; and the adaptability to year round flowering with photoperiod manipulation.

PATENTS

GRANTED JUNE 28, 1977

ERRATA

For CLASS	See PATENT NO.
250–237 S	4,031,595
034–235	4,031,631
072–367	4,031,745
084–001.03	4,031,786
116–034 R	4,031,845
239–684	4,031,929
214–767	4,032,015
228–200	4,032,033
303–116	4,032,200
046–202	4,032,295
428–567	4,032,301
075–240	4,032,302
260–635 D	4,032,458
235–078 R	4,032,754
361–398	4,032,819
361–333	4,032,820
361–334	4,032,821
361–205	4,032,822
361–194	4,032,823
363–25	4,032,830
363–002	4,032,831
363–043	4,032,832
363–078	4,032,833
363–128	4,032,834
364–200	4,032,895
364–200	4,032,896
364–900	4,032,897
364–200	4,032,898
364–200	4,032,899
364–200	4,032,900
340–365 R	4,032,931
364–900	4,032,946
323–044 F	4,032,959

PATENTS

GRANTED JUNE 28, 1977

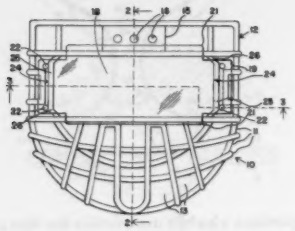
ERRATA

PATENTS

GRANTED JUNE 28, 1977

GENERAL AND MECHANICAL

4,031,564
HOCKEY MASK
Theodore W. Wood, 17 Ash St., Sherborn, Mass. 01770
Filed June 24, 1976, Ser. No. 699,268
Int. Cl.² A41D *13/00*
U.S. Cl. 2—9 **11 Claims**



1. A hockey mask comprising:

a grille work for substantially covering the face of a hockey player, said grille work defining a plurality of apertures sufficiently small to prevent passage of a hockey stick and a larger sized, elongated, curved opening positioned to extend adjacently to the player's eyes and to substantially encompass the player's field of vision;

fastening means for securing said grille work to a hockey helmet;

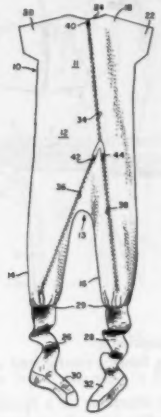
holding means located at each end of said elongated opening;

a curved, flexible, transparent shield with inner surface edge portions bearing against said grille work so as to cover said opening and having ends retained by said holding means, said shield formed from a high impact resistant material and being retained by said holding means in a state of flex corresponding to its normal curvature; and

securing means on said ends of said shield for restraining movement thereof out of said holding means.

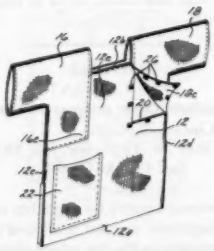
4,031,565
UNITARY BURIAL UNDERGARMENT
John H. Coates, Rte. 3, Box 572, Saluda, S.C. 29138
Filed Feb. 23, 1976, Ser. No. 660,275
Int. Cl.² A41B *9/00*
U.S. Cl. 2—78 R **5 Claims**

1. A unitary burial undergarment comprising upper and lower torso sections, leg sections, and feet sections joined together in an integral garment assembly adapted to cover the full body of the deceased at least below the shoulders, at least said feet sections being knitted, said torso section having a neck opening therein, the back side of said torso section having an upper slit opening therein extending from said neck opening to the waist level of said torso section, the back side of said lower torso section having two lower slit openings diverging from a common termination communicating with the lower end of said upper slit opening in generally inverted Y-shaped fashion across the respective buttocks into at least the upper ends of said leg sections to points at least adjacent



to knitted sections; and closure means to close the respective slit openings.

4,031,566
NURSING GARMENT
Marilyn M. Johnson, 790 Griffith Way, Laguna Beach, Calif. 92651
Filed July 21, 1976, Ser. No. 707,450
Int. Cl.² A41D *1/20*
U.S. Cl. 2—104 **5 Claims**



1. A nursing garment for enabling a mother to nurse a baby comprising in combination,

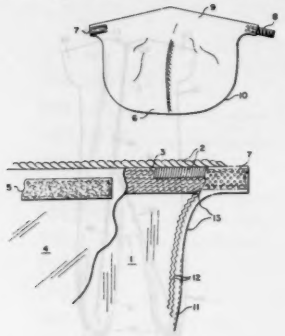
generally rectangular front and rear garment panels of width approximating the width of the mother's torso, said front panel being formed with a generally right angle cutout in each of two corners providing breast-exposing openings in said front panel,

and a pair of sleeve/shoulder members each of which is connected to and between said front and rear panels and has a generally right angle portion which overlays the corresponding breast-exposing opening in said front panel.

4,031,567
HEADDRESS

Jane S. Planck, 939 26th St. NW., Washington, D.C. 20037

Filed Feb. 26, 1976, Ser. No. 661,680
Int. Cl.[2] A42B 1/04
U.S. Cl. 2—204 3 Claims



1. A headdress comprising:

A. a head covering fabric, configured as a semi-circle and having:

i. a leading edge diameter as a headband with fastening portions extending laterally on each side of said semi-circle, said headband at its median portion being positioned over the forehead and adjacent the ears of the wearer with said fastening portions over lapping and being secured to each other behind the head at the nape of the neck; and

ii. a semi-circular trailing edge defining an arcuate body portion contiguous with said headband and adapted for covering the head and neck of the wearer in which a wedge-like segment is removed from the center of said semi-circle from its trailing edge inwardly and the opposed sides exposed by said wedge are joined by stitching as a dart extending from the nape of the neck towards the dome of the wearer's head;

B. complementary fastening means secured to said fastening portions, so as to secure said portions to each other at a point of overlap adjacent the nape of the wearer's neck; and

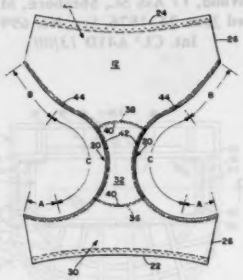
C. at least one frictional engagement pad supported on the underside of said headband, so as to engage a side of the wearer's head.

4,031,568
LEGLESS PANTY

Bernice Huff, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 30, 1975, Ser. No. 582,491
Int. Cl.[2] A41B 9/04
U.S. Cl. 2—406 8 Claims

1. In a legless women's panty having a hip encircling portion for extending completely around a wearer's torso and provided with leg openings with the edges thereof being elasticized and curvilinearly extending along the wearer's groin and generally outwardly over the wearer's hips and completely around the outside of the wearer's thighs, the improvement comprising means for differentially tailoring the elasticity along the leg opening edges, pulling the portion of the leg opening edges adjacent the groin outwardly against the inside of the wearer's legs and pulling the portion of the leg opening edges extending across the outside of the wearer's legs inwardly towards the wearer's groin, said means gathering said leg opening edges generally only along the groin to thereby provide a smooth outside appearance, reduce bunching under the buttocks and riding up thereon together with self adjustable easing of the leg openings outwardly of the groin to accommodate thighs of differing sizes, wherein said means comprises elastic band means extending substantially entirely along each of the leg opening edges secured thereto in a manner to gather said leg opening edges at least along the portions thereof lying along the wearer's groin while leaving



the edge portions which in use overlies the hips and at least the outside of the wearer's legs smooth and ungathered, and elastically providing, during use, a directed pull of the leg opening edges extending about the wearer's legs towards the groin from both the front and the rear directions.

4,031,569
NASAL SEPTUM PLUG

H. John Jacob, 8344 Hendrie, Huntington Woods, Mich. 48070

Filed Mar. 15, 1976, Ser. No. 666,577
Int. Cl.[2] A61F 1/00, 1/24
U.S. Cl. 3—1 5 Claims

1. In a device for plugging a hole formed through a nasal septum, the improvement comprising:

a. a central portion having opposed ends, the central portion being sized and shaped for disposition within the hole,

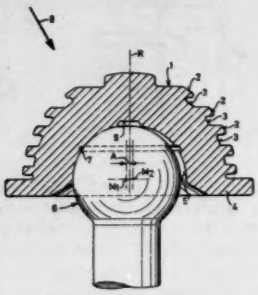
b. a disc of greater diameter than the central portion formed on each end of the central portion, and

wherein the device is a unitary, solid member which is formed from a chemically inert, non-toxic, non-irritating flexible material.

4,031,570
PROSTHETIC ACETABULUM

Otto Frey, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 27, 1976, Ser. No. 690,717
Claims priority, application Switzerland, June 18, 1975, 7898/75
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.912 3 Claims



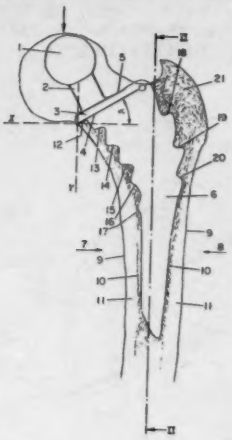
1. A hip joint endoprosthesis comprising
a joint head with a spherical surface; and
a prosthetic acetabulum having a concave articular surface receiving said joint head and at least one groove within said surface extending peripherally of said surface and said joint head, said articular surface being a surface of rotation having as a generatrix a quadrant arc with a radius corresponding to the radius of said joint head spherical surface but a center of curvature spaced a predetermined distance from the rotational axis around which said quadrant arc is rotated for generating said surface of rotation of said acetabulum.

4,031,571
HIP ENDOPROSTHESIS WITH STEPPED LOAD-TRANSFERRING SURFACES

Günther Heimke, Mannheim, and Peter Griss, Plankstadt, both of Germany, assignors to Friedrichsfeld GmbH Steinzeug-und Kunststoffwerke, Postfach, Germany

Filed Dec. 24, 1975, Ser. No. 644,332
Claims priority, application Germany, Dec. 24, 1974, 2461339; Apr. 22, 1975, 2517702
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.913 15 Claims

1. In a thigh portion of a cement-free implant of a hip joint total endoprosthesis, comprising a femur shaft, a head mounted on a neck attached to the upper end of the shaft, and a load supporting contact surface surrounding said neck, said implant having a biologically benign surface, said shaft being provided on its inner and outer sides with a series of outwardly projecting, transverse stepped, load-transferring flat surfaces, each of said surfaces being in a plane perpendicular to the longitudinal direction of orientation of the spicules of the

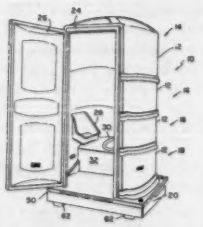


spongy tissue in the femur adapted to be adjacent to each of said surfaces.

4,031,572
CHEMICAL TOILET CABANA SHELL SECTION

George W. Harding, Warren, Mich., assignor to Poly San Corporation, Sarasota, Fla.

Division of Ser. No. 493,256, July 31, 1974, which is a division of Ser. No. 378,316, July 11, 1973, Pat. No. 3,835,480. This application Dec. 8, 1975, Ser. No. 638,815
Int. Cl.² A47K 11/02; A61L 11/00; E04H 14/00
U.S. Cl. 4—111 5 Claims



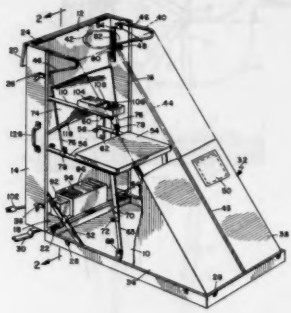
1. A shell adapted to be used as a top, intermediate, or bottom member of a portable enclosure, and molded of a rigid plastic-like, thermally stable material, comprising:
a dome-like roof;
a side wall extending downwardly from said roof and terminating in a bell-like enlarged lower end; and
a base flange extending outwardly from the enlarged lower end of said side wall;
whereby said dome-like roof may be removed to form a base member of said enclosure, said base flange may be removed to form a top member of said enclosure, and both said dome-like roof and said base flange may be removed to form an intermediate member of said enclosure.

4,031,573

PORTABLE SAUNA

Paul Ira Romanoff, 4602 Collwood Lane, San Diego, Calif. 92115

Filed Sept. 17, 1976, Ser. No. 724,750
Int. Cl.² A61H 33/06
U.S. Cl. 4—164 10 Claims



1. A collapsible portable hot air and steam bath apparatus, said apparatus comprising:

a substantially rigid box-like body portion having a deep section and a shallow section hinged together along the bottom, said deep section extending vertically for defining a rigid back wall and a portion of two side walls, said shallow section folding downward for defining a floor;

a flexible cover defined by a pair of generally triangular shaped side panels connected along the base thereof to said floor, a sloping rectangular front panel connected at the lower edge thereof to said floor and extending upward to a horizontally extending rectangular top panel connected to the upper end of the back wall and said side walls so that said cover extends from the edges of said section over the opening thereof for defining an enclosable chamber;

a pair of support arms pivotally mounted on the inside of said deep section and extendable outward for supporting said top portion of said flexible cover outward in a horizontal plane;

a neck receiving opening formed in said top portion of said cover;

an elongated opening formed in said front panel extending from said neck opening downward to said floor;

a foldable seat pivotally connected to said back wall and to said floor and opening to a supporting position upon opening said floor panel to the horizontal position;

heating means mounted in said chamber; and

control means for controlling said heating means pivotally mounted to said deep section for pivotally extending outwardly to a portion above and to one side of said seat for ease of access by an occupant of said chamber.

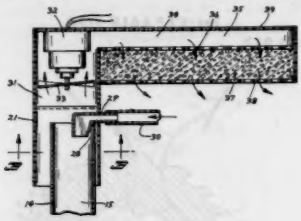
4,031,574

TIMED VENTILATOR FOR TOILETS

Frank D. Werner, Box SR9, Jackson, Wyo. 83001

Filed June 17, 1976, Ser. No. 697,139
Int. Cl.² A47K 3/22; E03D 9/04, 13/00
U.S. Cl. 4—213 8 Claims

1. A ventilator for toilets having a water supply tank and an overlap pipe in the tank open to the toilet bowl comprising a housing supported on said overflow pipe on the interior of said tank, said housing including wall means defining a passageway open to said overflow pipe, a filter compartment open to said passageway and having an air discharge side opening to the interior of said tank, fan means in said passageway for causing air flow from the overflow pipe through said passageway and said filter compartment, a power supply and control for said fan mounted on said tank and including a control member on the exterior of said tank for manual operation, said control comprising a manually depressable button completing a circuit to said fan and pneumatic delay means to resist return of said circuit to open position said pneumatic delay means



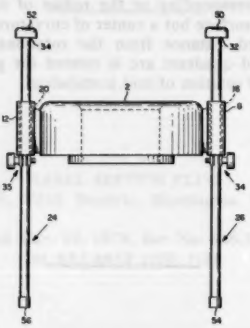
comprising a chamber coupled to said button whereby depressing said button changes the size of said chamber, means tending to return the chamber to its original size, and means to permit air to bleed relative to said chamber at a controlled rate.

4,031,575

ADJUSTABLY MOUNTED SUPERIMPOSABLE TOILET SEAT

Kurt Landsberger, 103 Harrison St., Verona, N.J. 07044

Filed May 24, 1976, Ser. No. 689,130
Int. Cl.² A47K 13/06, 13/28
U.S. Cl. 4—239 7 Claims



1. An adjustably mounted toilet seat of the type superimposable on a conventional toilet seat, comprising:

a superimposable toilet seat;

a pair of frame members, each of which extends along an opposite side of the superimposable toilet seat;

each of the frame members carrying front and rear corner members;

a pair of vertically disposed rails, each of which has a pair of parallel legs, one of the legs of each of the rails being slidably supported by one of the front and rear corner members of a corresponding frame member and the other leg being slidably supported by the other of the front and rear corner members, the superimposable toilet seat being thereupon longitudinally adjustable along the rails; and

means associated with the rail legs for retaining the superimposable toilet seat in a predetermined longitudinally adjusted position relative to the height of the conventional toilet seat and including a pair of bars, each of which extends between the legs of a corresponding rail for supporting the superimposable seat, a pair of clamps associated with each of the bars, each of the clamps

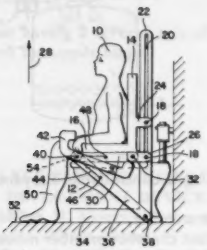
cooperating with a bar end for clamping the end to a corresponding rail leg, means arranged with the clamps and bar ends and loosened for longitudinally displacing the bars along the legs to the adjusted position relative to the height of the conventional toilet seat, and said means tightened for retaining the bars and superimposable toilet seat supported thereby in the adjusted position.

4,031,576

INVALID TOILET AID

Helen Charlotte Epstein, 1193 S. 19th East, Salt Lake City, Utah 84108

Filed May 24, 1976, Ser. No. 689,550
Int. Cl.² A47K *13/10*
U.S. Cl. 4—251 **8 Claims**



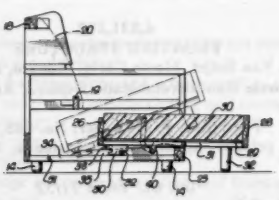
1. An invalid toilet aid comprising a commode seat, a frame, a backrest, at least one arm rest, said at least one arm rest fixedly secured to said backrest, hingeing means for pivotably securing a rear portion of said commode seat to said backrest, spring bias means for urging said at least one arm rest into an uppermost position, said spring bias means for resisting said at least one arm rest being disposed in a lowermost position, said commode seat being disposed in a near vertical position when said at least one arm rest is disposed in said uppermost position, said commode seat being disposed in a horizontal position when said at least one arm rest is disposed in said lowermost position, said frame providing sliding vertical support for said backrest.

4,031,577

CONVERTIBLE SOFA BED

Vincent C. Kanowsky, Newport Beach, and Lloyd A. Blanc, Downey, both of Calif., assignors to Allied Upholstery Mfg. Inc., Lynwood, Calif.

Filed Jan. 5, 1976, Ser. No. 646,625
Int. Cl.² A47C *17/14*
U.S. Cl. 5—17 **8 Claims**



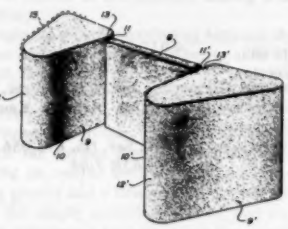
1. In a convertible sofa bed, the combination of:
a frame having a base and a back, said base having a front support edge and said back having an overhanging edge;
a seat movable between
a retracted sofa position resting on said frame, with a sloping upper surface positioned partially under said overhanging edge and having front support means adjacent the front edge of said seat and positioned behind said base front support edge thereby concealing said seat front support means behind said base front support edge, and
an extended bed position with said front support means in front of said base front support edge for resting on the floor supporting the seat and having rear support means adjacent the rear edge of said seat,
said base including guide means for said seat rear support means for positioning said seat horizontally; and
a link at each end of said seat pivotally connected to said seat and to said frame.

4,031,578

CONTOURED TRAVEL PILLOW

Doris Sweeney, 512 A Taylor Ave., Warrington, Pa. 18976, and Mary Ellen Lee, 7951 Anita Drive, Philadelphia, Pa. 19111

Filed May 20, 1976, Ser. No. 688,550
Int. Cl.² A47G *9/00*; A61G *7/06*
U.S. Cl. 5—337 **8 Claims**



1. A travel pillow comprised of three discrete and resilient sections:
1. a central section which serves as a spacer and supports the back of the user's head and
2. a matching pair of lateral head sections located on opposite sides of said spacer (1) to form a generally H-shaped configuration therewith;
and a snug-fitting cover which accommodates all three sections and maintains them in their generally H-shaped configuration;
both of the head sections (2) being of greater thickness than spacer (1) and possessing a tapered appearance which begins with a flat and generally wide back-wall and a narrower, rounded front portion;
said back-wall being disposed at an angle which slopes toward the central section so that the backward pressure of the user's head on said spacer (1) will cause the said back-walls to form an essentially parallel plane and draw the inner side-walls toward one another, for contact with the user's head.

4,031,579

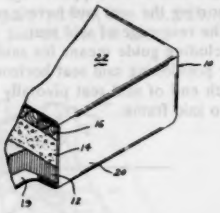
AIRCRAFT SEAT CUSHION

Thomas A. Larned, Costa Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 19, 1975, Ser. No. 642,525
Int. Cl.² A47C *27/00*
U.S. Cl. 5—355 **2 Claims**

1. A cushion adapted for use in an aircraft seat used by crewmen, comprising: a close cell plastic layer of shock absorbent material; an elastic flow cushioning layer positioned over the shock absorbent layer; a flame resistant cover surrounding

the shock absorbent layer and the cushioning layer; a ventilation layer positioned between the cushioning layer and the



cover; the side of said cover adjacent the ventilation material having high porosity and being mositure absorbent.

4,031,580

INFLATABLE BOAT

Henning Neumann, Germering, and Fritz Federer, Turkenfeld, both of Germany, assignors to Metzeler Kautschuk AG, Munich, Germany

Filed Apr. 8, 1976, Ser. No. 675,056

Int. Cl.² B63B 7/08

U.S. Cl. 9—2 A **34 Claims**

1. In an inflatable boat, a combination comprising an elongated body of elastically yieldable material having a deck portion and a hull portion which together bound an interior of the boat; at least one access opening in said deck portion subdividing the latter into a front section and a rear section as considered in the direction of travel of the boat and communicating the exterior of the boat with said interior; means for giving said body a desired configuration, including a plurality of inflatable tubular elements extending substantially longitudinally of said body, the tubular elements associated with said front section of said deck portion diverging in rearward direction and forming on said front section a plurality of diverging bulges alternating with grooves which are tranversely spaced by a distance which is greatest at said access opening; support means surrounding said access opening, including an elastically yieldable collar-shaped support member connected to said deck portion around said access opening and having an inner and an outer circumferential surface; at least one rigid seat at least partially accommodated in said interior and having a contact portion received in the respective access opening and a marginal portion supported on said support member; sealing means between said inner circumferential surface of said support member and said contact portion of said seat and operative for preventing seepage of water into said interior between the former and the latter; and connecting means for dismountably connecting said seat to said support member, including a ring-shaped element surrounding said support member at said outer circumferential surface thereof, and means for urging said ring-shaped element against said outer circumferential surface to thereby press said sealing means into sealing contact with said contact portion of said seat.

4,031,581

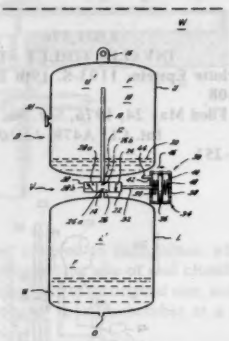
SUB-SEA ADJUSTABLE BUOY

Benton F. Baugh, Houston, TX, assignor to Vetco Offshore Industries, Inc.

Filed Mar. 29, 1976, Ser. No. 671,276

Int. Cl.² B63B 21/52

U.S. Cl. 9—8 R **3 Claims**



1. A buoy having a controllable buoyancy in water, comprising:

a first chamber member;

a second, buoyant chamber member mounted with said first chamber member;

said first chamber member having a first chamber therein for containing variable amounts of a fluid which is buoyant in water and for containing variable amounts of water;

said first chamber member having an opening formed in its bottom to permit water to pass into and out of said first chamber and fill the portion of said first chamber which is not occupied by buoyant fluid;

control means operably connected to said first chamber for regulating the amount of buoyant fluid in said first chamber so that the buoyancy of the buoy in water is controlled;

said second chamber member has a second chamber therein for containing buoyant fluid under pressure;

said control means is operably connected to said second chamber and said first chamber; and

said control means includes control valve means for controllable movement between a charging position in which buoyant fluid is conveyed from said second chamber to said first chamber, a blocking position in which buoyant fluid is prevented from escaping from said first and second chambers, and a venting position in which buoyant fluid is vented from said first chamber.

4,031,582

FLOATING STRUCTURE

Willem J. Van Heijst, Monte Carlo, Monaco, assignor to N.V. Industrieele Handelscombinatie Holland, Rotterdam, Netherlands

Filed Mar. 9, 1976, Ser. No. 665,333

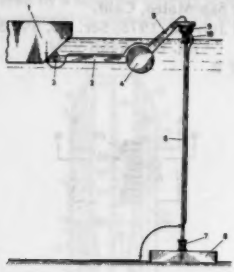
Claims priority, application Netherlands, Mar. 10, 1975, 74.02829

Int. Cl.² B63B 21/52

U.S. Cl. 9—8 P **4 Claims**

1. Floating structure comprising a large floating body intersecting the water-level, a small submerged float connected with said body by means of a rigid arm, said arm having a rigid connection with the small float and a pivotal connection about only a horizontal pivot axis with the floating body, said small float further being connected with an anchor by means of a torsion-stiff tube or rod having a hinge with perpendicularly intercrossing or intersecting axes between the lower end of the

tube or rod and the anchor as well as between the upper end of the tube or rod and the said small float, said last mentioned



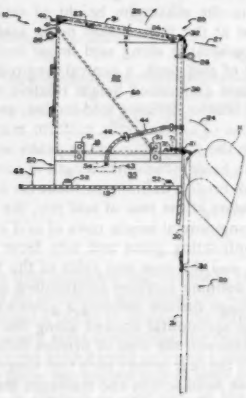
connection further having a vertical axis of rotation between the small float and the upper hinge.

4,031,583

INFLATABLE EMERGENCY EQUIPMENT DEPLOYMENT DEVICE

Ronald Wayne Phillips, II, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Dec. 22, 1975, Ser. No. 643,344
Int. Cl.² B63C 9/22
U.S. Cl. 9—14 4 Claims



1. An inflatable emergency escape equipment stowage and deployment device comprising:

a. a container having a floor and a back wall;

b. a pivotable panel substantially closing said container, said panel comprising:

1. a front section;

2. a top section;

3. a front hinge pivotally connecting said front section to said floor; and

4. a top hinge pivotally connecting said top section to said front section; and

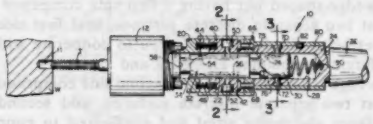
c. means operable to deploy an emergency evacuation inflatable from said container, said means including an inflation system secured to a deck, an edge of said inflation system being substantially flush with an edge of said deck and wherein said container is removably secured on top, over and flush with said inflation system.

4,031,584

THREADING ATTACHMENT FOR TURNING MACHINES

John Khachigian, 78-80 Capitol Ave., Hartford, Conn. 06103

Filed June 8, 1976, Ser. No. 694,032
Int. Cl.² B23G 1/00, 3/00
U.S. Cl. 10—89 H 10 Claims



1. An improved threading apparatus for producing threads with a turning machine such as a lathe which rotates a workpiece and threading tool relative to one another comprising:

a tool carrier member connectible in rigid engagement with a thread cutting tool for holding the tool on axis during a thread cutting operation;

a support member located remotely of the tool carrier and the thread cutting tool and connectible in rigid engagement with the turning machine for supporting the tool and tool carrier in the machine during a thread cutting operation;

a sliding spindle member extending between the tool carrier member and the support member in axial alignment with the tool, the spindle member being both axially translatable and rotatable relative to said carrier and support members;

first disengagable torque transmitting means interposed between the carrier member and the spindle member including on one of the two members a first axially extending groove and a first annular groove joined with one end of the axially extending groove, and on the other of the two members a tang engaging the joined grooves;

second disengagable torque transmitting means interposed between the support member and the spindle member and permitting axial translation of the two members relative to one another; and

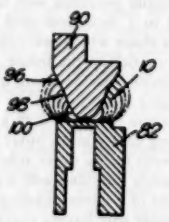
resilient means extending between the spindle member and one of the other members for urging the tang of the first torque transmitting means into the axially extending groove and away from the annular groove.

4,031,585

BINDING OF PERFORATED SHEETS

Sidney George William Adams, Hersham, England, assignor to James Burn Bindings Limited, Esher, England

Filed Feb. 9, 1976, Ser. No. 656,158
Claims priority, application United Kingdom, Feb. 13, 1975, 6178/75
Int. Cl.² B42C 5/12, 19/00
U.S. Cl. 11—1 A 7 Claims



1. A machine used in binding packets of perforated sheets into book form with wire binding elements, each such element being formed from a length of metal wire bent to form a series of curved hairpin-shaped prongs and having a longitudinal slot from one end thereof to the other, and each element being

adapted to receive said sheets in impaled relation prior to closing said element into binding relation with said packet, said machine comprising

a rectifying tool in the form of a wedge-shaped bar adapted to reciprocate into and out of the longitudinal slot in each binding element for conforming the shape and position of said element to a perdetermined standard,

said wedge-shaped bar having a first side comprised of at least two separate discrete surfaces, said first side surfaces being sized and configured to cooperate with two different size binding elements, and

said wedge-shaped bar having a second side comprised of at least two separate discrete surfaces, said second side surfaces also being sized and configured to cooperate with two different size binding elements,

one of said first side surfaces and one of said second side surfaces cooperating to conform the shape and position of a first size binding element, and the other of said first side surfaces and one of said second side surfaces cooperating to conform the shape and position of a second size binding element.

4,031,586

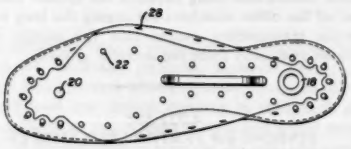
INSOLE FOR FOOTWEAR

Elisabeth von den Benken, and Henry von den Benken, both of 2212 Centre St., West Roxbury, Mass. 02132

Division of Ser. No. 468,223, May 9, 1974, Pat. No. 3,952,427. This application Dec. 8, 1975, Ser. No. 638,827

Int. Cl.² A43D *21/00*

U.S. Cl. 12—145 **1 Claim**



1. A method of assembling footwear which comprises:

a. preparing a shoe upper for lasting by punching a plurality of perforations through the shoe upper along its lasting margin and locating the perforations in such a way that the shoe upper will be properly lasted when tying it to an insole,

b. molding the insole provided with lasting hooks along its edge about ¼ to 1 inch from said edge and giving said lasting hooks a shape which prevents the shoe upper from slipping off once tied to the insole,

c. molding the insole provided with a shank reinforcement rib thus stiffening the insole in the shank area,

d. molding the insole provided with a protrusion which fits a corresponding cavity in an outer sole thereby assuring correct alignment of the outer sole and the insole,

e. molding the insole provided with a contour which fits the bottom contour of a corresponding last,

f. molding the outer sole having corresponding cavities for the lasting hooks, the protrusion and the shank reinforcement rib of the insole,

g. pulling the upper over the last and tying it to the insole by engaging the perforations in the shoe upper with the lasting hooks of the insole and,

h. attaching the molded outer sole to the prior lasted shoe.

4,031,587

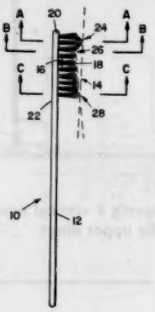
TOOTHBRUSH FOR CANINES

Ursula Dietrich, Hillsborough, Calif., assignor to Deepen Enterprises, Inc., San Mateo, Calif.

Filed July 28, 1975, Ser. No. 599,579

Int. Cl.² A46B *9/04*

U.S. Cl. 15—167 R **2 Claims**



1. A toothbrush for cleaning the teeth of animals which have a long narrow jaw, molars at the rear of the jaw, and secodontal crowned teeth forward of the molars, said toothbrush comprising a handle and a head attached to said handle, said handle having top and bottom ends and an intermediate neck, said head comprising at least three rows of longitudinally extending bristles defining longitudinally a peak adjacent said top end, a heel adjacent said neck, and a substantially linear incline from said heel to the foot of said peak, said incline having a maximum height at said heel substantially corresponding to the maximum height of said peak, and a minimum height at the foot of said peak, said head further defining in cross section along said linear incline from said heel to the foot of said peak, a central longitudinal trough of bristles of uniform diminished height relative to longitudinal outside rows of bristles defining said incline, and at said peak a ridge of bristles of substantially uniform maximum height, the bristles from the top end up to the peaks and down to the foot of said peak being of uniform length in cross-section, the tops of said peak bristles defining surfaces for confronting the tables of the molars at the rear of said jaw, the tops and sides of the outside longitudinal bristle rows of said incline defining surfaces for confronting gums and side faces of secodontal crowned teeth, and the tops and sides of the bristles of said central trough defining surfaces confronting said secodontal crowns, said trough further defining a guideway for tracking the tops of said secodontal crowns along the jaw line upon confrontation between the tops of bristles defining said peak and the tables of the rear molars such that longitudinal translation of said brush head scrubs and massages the gums and the tops and the sides of the teeth.

4,031,588

BROOM

Henri Joseph Marie Adrien Leroy, Le-Pre-Saint-Gervais, and Christian Ludovic Leroy, Perpignan, both of France, assignors to Henri Joseph Marie Andrien Leroy, Le-Pre-Saint-Gervais, France

Filed Sept. 15, 1976, Ser. No. 723,469

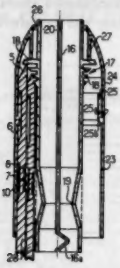
Claims priority, application France, Oct. 21, 1975, 75.32093

Int. Cl.² A46B *3/18*

U.S. Cl. 15—171 **9 Claims**

1. A broom constituted by a bundle of stems wound around a hollow or tubular bar reserved for the broom handle, the upper portion of the said bundle being fitted into a protective sleeve, the said hollow bar, bundle of stems and protective

sleeve constituting with the broom handle on either dismountable or non-dismountable assembly, wherein the winding of the stems is ensured by a separate binding strip of appropriate length of flexible material co-operating with mutually opposite



crenels, indentations or notches provided in the thickness of the stems, one of the said crenels serving as a fixing point for the strip and the other crenel serving as a passageway for the spirals or turns of the said strip so as to absorb or compensate for its thickness after the winding.

4,031,589

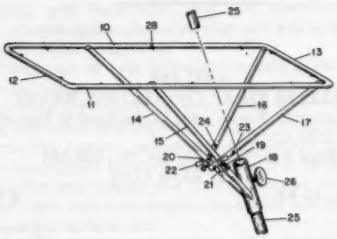
PORTABLE DRIP COLLECTOR

Robert L. Couch, Rte. 3, Box 583, Harriman, Tenn. 37748

Filed Apr. 21, 1976, Ser. No. 678,746

Int. Cl.² B05C *17/02, 21/00*

U.S. Cl. 15—248 R **9 Claims**



1. A portable drip collector for releasible attachment to a handle of a tool for overhead manipulation, which comprises: a rectangular hoop; a collar to receive the handle; a first and second pair of brace arms connecting the hoop to the collar, the first pair of arms each having one end connected to opposite sides of the hoop, the second pair of arms each having one end connected to corners of one end of the hoop; handle engaging means associated with the collar to releasibly engage the handle, and a disposable sheet collector fastened to and spanning the hoop.

4,031,590

PIPE SCRAPER

Edward Albert Clavin, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.

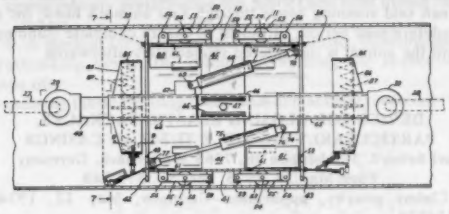
Division of Ser. No. 534,823, Dec. 20, 1974, Pat. No. 3,977,331. This application Sept. 9, 1975, Ser. No. 611,696

The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.

Int. Cl.² B08B *9/02*

U.S. Cl. 15—104.17 **16 Claims**

1. Apparatus for scraping the interior wall of a pipe, comprising carriage means having wheel means for engaging the wall of the pipe whereby said carriage means is movable longitudinally through the pipe, circumferentially segmented scraper means carried at only one end of said carriage means and disposed in a substantially complete circular arrangement around the interior wall of the pipe whereby substantially all of the circumference of the pipe wall will be scraped thereby,



said scraper means being expandable against the pipe wall and retractable therefrom, whereby said apparatus may be employed to scrape the interior wall of a pipe when moved through the pipe in one direction.

4,031,591

STUNNING METHODS AND APPARATUS

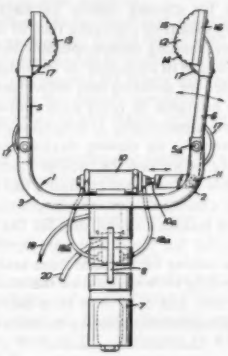
John Joseph Collins, Sudbury, England, assignor to Haverhill Meat Products Limited, Suffolk, England

Continuation-in-part of Ser. No. 514,601, Oct. 15, 1974, abandoned. This application Apr. 21, 1976, Ser. No. 679,047

Claims priority, application United Kingdom, Oct. 23, 1973, 49348/73

Int. Cl.² A22B *3/00*

U.S. Cl. 17—1 E **16 Claims**



1. A stunning tongs for stunning animals prior to slaughter comprising a frame, a handle portion mounted on said frame, a pair of stunning arms mounted on said frame for relative movement of at least one of said arms with respect to said frame, a stunning head on each of said arms, each of said stunning heads comprising a stunning electrode and presenting an area configured for pressure engagement of the head of an animal without penetration, a prime mover operably connected to said at least one arm to effect rapid relative closing movement between said arms to make rapid firm contact on opposite sides of said animal's head disposed between said arms, electronic stunning circuit means including timing means and connected to said electrodes for generating an impulse of predetermined waveform/frequency and voltage/current; an energizing means operably connected to both said prime mover and said stunning circuit means for energizing said prime mover and said stunning circuit means; manually actuable control means for actuating said energizing means to supply energy simultaneously to said prime mover and said electronic circuit means; said electronic stunning circuit means being operable in timed relation to said prime mover to

energize the electrodes subsequent to activation of said control means but prior to engagement of the electrodes with the animal's head so that instantaneously with the contact of the electrode heads on the animal's head said impulse of predetermined waveform/frequency and voltage/current passes between said stunning heads through said animal's head, for a predetermined period, sufficient to ensure complete stunning until the animal is slaughtered immediately afterwards.

4,031,592

DEVICE FOR CLOSING ELASTIC PACKAGES, PARTICULARLY FLEXIBLE TUBULAR CASINGS

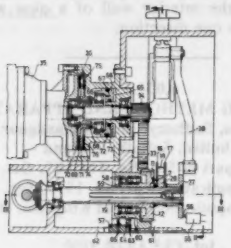
Karl Schnell, Muhlstrasse 28, 7065 Winterbach, Germany

Filed May 20, 1975, Ser. No. 579,140

Claims priority, application Germany, May 22, 1974, 2424979

Int. Cl.² A22C *11/00*

U.S. Cl. 17—33 **12 Claims**



1. In a device for closing elastic packages, particularly tubular casings, by means of clamping ties, of the type including a cutting device, feeding means operable to feed a substantially continuous length of clamping tie material intermittently to the cutting device for severing into individual clamping ties, a bending device operable to bend each individual clamping tie into an inverted substantially U-shaped including a pair of spaced legs, a clamping tie closing device operable to wrap each bent clamping tie around the tubular casing to be closed, and means operable to feed bent clamping ties from the bending device to the closing device: the improvement in which said cutting device includes a limit stop for the free end of the clamping tie material fed thereto by said feeding means and further includes a cutting tool spaced from said limit stop by a spacing corresponding to the length of the clamping tie to be cut; said cutting tool and said limit stop being mounted for adjustment and displacement relative to each other.

4,031,593

HOT SHELF SEED COTTON TOWER DRYER APPARATUS AND METHOD

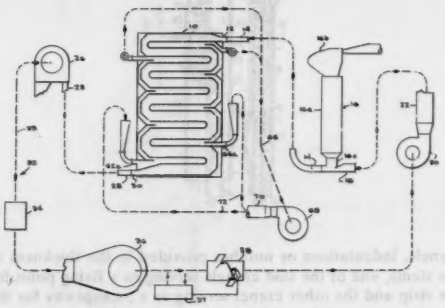
Arvel L. Vandergriff, P.O. Box 457, Corcoran, Calif. 93212

Filed Oct. 7, 1975, Ser. No. 620,495

Int. Cl.² D01G *37/00*

U.S. Cl. 19—.27 **28 Claims**

1. Seed cotton dryer apparatus of the parallel flow tower type for conditioning seed cotton for ginning comprising, a vertically elongated drying tower casing having spaced apart vertical lateral walls and front and rear sides and having an inlet adjacent the top for connection to an air duct through which seed cotton is pneumatically conveyed to receive cotton-conveying heated drying air and cotton conveyed by the drying air and having an air and cotton outlet adjacent the bottom means for heating the drying air, a plurality of vertically spaced horizontal metallic shelves fixed in the casing providing flat horizontal upwardly facing shelf surfaces extending in horizontal planes between said lateral walls and spanning the width of the casing, said shelves from the uppermost to the lowermost commencing alternately from opposite front and rear sides of the casing and each terminating short of the side opposite its commencement thereby defining a continuous restricted zig-zag flow path from the upper end to the lower end of the casing communicating respectively with said inlet and said outlet, the heated drying air and cotton conveyed thereby being admitted to the upper end of said flow path at said inlet to be circulated through said flow path for evaporating moisture from the cotton in the dryer while the



drying air impels the cotton along the flow path, and means for supplying heat to said metallic shelves independent of said cotton conveying heated drying air coursing through the drier for heating the surfaces of the shelves substantially throughout their extent to diminish the loss of heat energy from the heated drying air as courses from top to bottom through said flow path and to aid drying of the cotton.

4,031,594

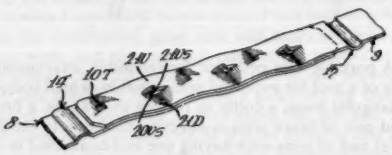
SEALLESS STRAP CONNECTION MEANS

Talivaldis Cepuritis, Kenilworth, Ill., assignor to Signode Corporation, Glenview, Ill.

Filed Apr. 26, 1976, Ser. No. 680,164

Int. Cl.² B65D *63/02*

U.S. Cl. 24—20 EE **8 Claims**

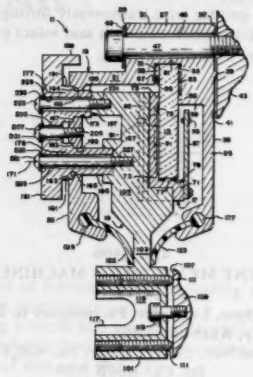


1. A sealless strap connection between overlapped lengths of strap which comprises an array of longitudinally spaced joints, each joint comprising lengthwise protuberances presenting opposed, overlapping, non-interlocking shoulders each having a transverse face displaced for the respective planes of said overlapped lengths of strap and further comprising lengthwise protuberances presenting opposed interlocking shoulders each having a transverse face displaced from the respective planes of said overlapped lengths of strap, said interlocking shoulders being shaped to interlock with each other, at least one of the protuberances of said array on one of said lengths of strap having, behind the transverse face of one of said interlocking shoulders, an upwardly displaced corner forming a protruding tongue arranged and positioned to irreversibly override the transverse face of an oppositely facing non-interlocking shoulder as the interlocking shoulders are moved into an interlocking position, and to present a stop to the non-interlocking shoulder adjacent to said corner when said interlocking shoulders are interlocked with each other.

4,031,595
HIGH PRECISION INCREMENTAL DISTANCE MEASURING SYSTEM

Helmut Welker, Jamestown, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,863
Int. Cl.² H01J 3/14
U.S. Cl. 250—237 G 17 Claims



1. In measuring apparatus securable to first and second relatively movable members for determining the relative displacement therebetween, wherein said first movable member has a substantially flat mounting surface, wherein said apparatus includes a scale, means for supporting said scale, transducer means, transducer support means and means for interconnecting said transducer with said transducer support means, wherein said scale has an edge and a face, and wherein the improvement comprises:

a. a first pair of rails provided on said scale supporting means for engagement with said mounting surface;

b. said scale supporting means including means for positioning means for securing said scale supporting means to said mounting surface, said positioning means locating said securing means between said first rails so as to insure that said first rails engage and conform to said mounting surface when said scale supporting means is secured to said mounting surface; and

c. a second pair of rails provided on said scale supporting means, said second rails cooperating with said scale face to position said scale on said scale supporting means, at least one of said second rails and one of said first rails being approximately aligned and solidly interconnected in a direction substantially perpendicular to the surface defined by said first rails when said scale supporting means is viewed in cross-section.

4,031,596
INTEGRATED FINISHING AND COMPRESSIVE PRESHRINKING OF A HIGH-SHRINKAGE FABRIC

Herman J. Joy, Latham, N.Y., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.

Continuation of Ser. No. 262,579, June 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 224,892, Feb. 9, 1972, abandoned. This application Jan. 7, 1975, Ser. No. 539,216
Int. Cl.² D06C 21/00
U.S. Cl. 26—18.6 4 Claims

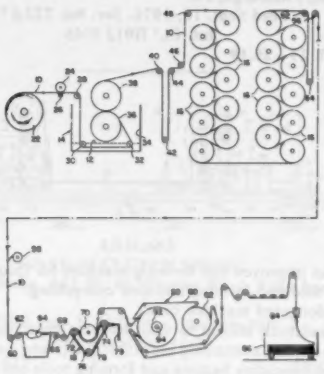
1. A method for continuously manufacturing, finishing and preshrinking fabric, the method comprising the sequential steps of:

creating fabric by using conventional machinery, said fabric being known as greige fabric which has been stretched in said machinery and is susceptible therefor of relatively high shrinkage after washing, taking said greige fabric from said machinery to a padder and impregnating said greige fabric with a finishing liquid therein including starch to a moisture content in excess of 50% by weight, partially drying the fabric, measuring and maintaining a moisture content between 10 and 30% by weight,

compressively preshrinking the fabric, and fully drying the fabric.

4. A method for continuously manufacturing, finishing and preshrinking fabric, the method comprising the sequential steps of:

creating fabric by using conventional machinery, said fabric



being known as greige fabric which has been stretched in said machinery and is susceptible therefor of relatively high shrinkage after washing,

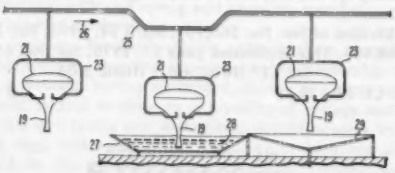
taking said greige fabric from said machinery to a padder and impregnating said greige fabric with a finishing liquid therein including starch to a moisture content in excess of 50% by weight, passing the fabric over a series of hot cans to partially dry the fabric, measuring and maintaining a moisture content in the fabric between 10 and 30% by weight,

compressively preshrinking the fabric in a rubberbelt compressive preshrinking unit, and fully drying the fabric.

4,031,597
METHOD OF ASSEMBLING A MOUNT ASSEMBLY IN THE NECK OF A CATHODE-RAY TUBE

Jawdat Ibrahim Nubani, Clarks Summit, and Walter Robert Rysz, Moosic, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 22, 1976, Ser. No. 725,583
Int. Cl.² H01J 9/18
U.S. Cl. 29—25.16 8 Claims



1. In a method for sealing a mount assembly in the neck of a cathode-ray tube having a faceplate panel and a luminescent screen thereon, the steps in the following order:

a. coating the inner surface of said neck with a film of organic material which is volatilizable when heated in air at temperatures below about 400° C,

b. sliding said mount assembly into said neck to a perdeter-

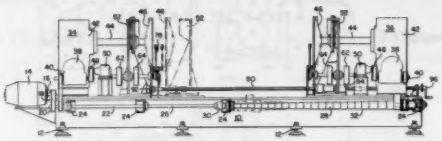
mined oriented and spaced position with respect to said screen,
c. sealing said mount assembly into said neck,
d. and volatilizing said film.

4,031,598

END-FORMING MACHINE FOR FLUORESCENT LAMP TUBES

William J. Summers, Montclair, and William F. Betz, Livingston, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 16, 1976, Ser. No. 723,673
Int. Cl.² H01J *9/46*
U.S. Cl. 29—25.19 **8 Claims**



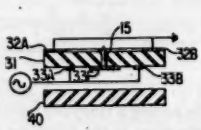
1. An improved end-forming machine for fluorescent lamp tubes, said end-forming machine comprising:
an elongated machine base,
a headstock affixed to said machine base, said headstock including a rotatably indexable lamp tube carrying turret, reciprocating heating and forming tools operable to neck down one end of said lamp tubes and operating means for operating said turret and said heating and forming tools in sequence,
a tailstock including a rotatably indexable lamp tube carrying turret, reciprocating heating and forming tools operable to neck down the other end of said lamp tubes and operating means for operating said turret and said heating and forming tools in sequence, said tailstock being mounted to said machine base for relative movement therewith and selective positioning with respect thereto,
locating drive means associated with said tailstock for selectively positioning said tailstock along the length of said machine base a preselected distance from said headstock whereby lamp tubes of different lengths can be accommodated between the headstock and tailstock,
single drive shaft means extending for substantially the length of said machine base,
drive means for driving said single drive shaft means at a preselected speed, and
means coupling each of said headstock and tailstock operating means to said single drive shaft means.

4,031,599

METHOD OF MAKING STATIC ELECTRICITY SUPPRESSOR WITH PATTERNED COATING

Anthony Q. Testone, Lee, Mass., assignor to Statics Inc., Lee, Mass.

Division of Ser. No. 568,107, April 14, 1975, Pat. No. 3,968,405. This application June 15, 1976, Ser. No. 696,322
Int. Cl.² H01G *4/02;* **H05K** *3/06*
U.S. Cl. 29—25.41 **3 Claims**



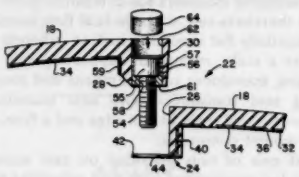
1. A method of making a static electricity suppressor comprising:
a. providing a plate of electrically insulating material,
b. coating said plate on the opposite surfaces thereof with a thin layer of electrically conductive material,
c. removing from a first surface a portion of the layer thereon,
d. removing from the opposite surface a portion of the layer thereon and leaving on said opposite surface an intact portion of the layer thereof which is in alignment with the part of the first surface from which the layer thereon has been removed,
e. passing an emitter wire transversely through said plate,
f. engaging said emitter wire with said intact portion of said second layer only.

4,031,600

ATTACHMENT MEANS FOR A MACHINERY DRUM COVER

Biddle A. Whigham, Lancaster, Pa., assignor to The Fluorocarbon Company, Anaheim, Calif.

Filed Nov. 10, 1975, Ser. No. 630,109
Int. Cl.² B60B *7/00*
U.S. Cl. 29—118 **11 Claims**

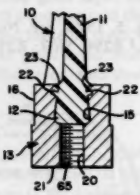


1. A replaceable cover assembly for an anvil roller to provide a contact surface for cutting blades located on an adjacent rotary cutting roller, said anvil roller having a transverse slot generally parallel to the axis of said roller, said cover comprising:
a cover band of an elastomeric material for positioning around said roller and having a first end and a second end;
a backing plate of material more rigid than said elastomeric material securely attached to the interior surface of said cover band;
an inwardly extending backing plate flange integrally connected to said backing plate adjacent said first end of said cover band for insertion in said alot adjacent one edge of the slot, said flange having an offset portion extending beyond said first end for contact with a substantial portion of the bottom of said slot;
a depending inward cover band flange of elastomeric material connected to said second end of said cover band, said depending flange being positioned in said slot above and in contact with said backing plate flange;
a flange of elastomeric material integrally connected to said cover band first end for extending into said slot between said backing plate flange and said cover band flange on said second end;
a flange integrally connected to said backing plate adjacent said cover band second end for extending into said slot adjacent the other edge of the slot, said flanges filling said slot so that the exterior surface of the cover band above said slot is uniform and uninterrupted except for a seam between said cover band ends; and
means for fastening said backing plate flange and said cover band flange to said roller in said slot.

4,031,601
METHOD OF FABRICATING AND MOUNTING A FIBERGLASS FAN BLADE

Norman T. Staub, and Anthony F. Staub, both of Dayton, Ohio, assignors to Dayton Scale Model Company, Dayton, Ohio

Continuation of Ser. No. 549,067, Feb. 11, 1975, abandoned. This application July 30, 1976, Ser. No. 710,175
Int. Cl.² B29D 3/02; B29G 3/00
U.S. Cl. 29—156.8 B **6 Claims**



1. A method of fabricating and mounting a fiberglass fan blade in a hub, comprising:
   a. producing a metal hub having a dovetail slot in one end thereof and also having a bore extending from the other end thereof into said slot,
   b. assembling a plurality of layers of fiberglass sheet material impregnated with heat liquifiable and heat curable resin in superposed relation forming an assembly of predetermined dimensions, each of said layers including a blade portion and a root portion of a width at least equal to the diameter of said hub,
   c. interleaving additional pieces of said fiberglass sheet with said root portions of said layers to increase the thickness of the root portion of said assembly to approximately the configuration of said hub slot,
   d. inserting said root portion of said assembly into said slot,
   e. placing said assembly and hub in a mold which includes cavities for said blank and said hub and a shoulder at the inner end of said hub cavity,
   f. heating said mold until said resin substantially liquifies while maintaining said one end of said hub in seated relation with said shoulder,
   g. forcing additional substantially liquified resin and fiberglass material through said bore into said slot until said slot and all spaces between adjacent said layers are completely filled,
   h. closing said heated mold at a predetermined rate into fully closed relation with said assembly and said hub, and
   i. effecting curing of said resin while maintaining said mold closed.

4,031,602
METHOD OF MAKING HEAT TRANSFER TUBE

James L. Cunningham, and Bonnie J. Campbell, both of Decatur, Ala., assignors to UOP Inc., Des Plaines, Ill.

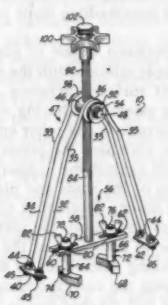
Division of Ser. No. 681,006, April 28, 1976. This application Sept. 14, 1976, Ser. No. 722,922
Int. Cl.² B23P 15/26
U.S. Cl. 29—157.3 AH **4 Claims**

1. A method of making a heat transfer tube having inner and outer fins comprising the steps of inserting a core member having a plurality of radially extending longitudinal fins inside a smooth surfaced cylindrical tube and subjecting at least a portion of the outside surface of the composite assembly to a plurality of finning tools so as to produce external fins on the tube and reduce its internal diameter to a dimension less than the external diameter of the finned core member.

4,031,603
SNAP-IN CLUTCH SPRING

William E. Shultz, 442 W. St. Charles Road, Villa Park, Ill. 60181

Filed July 1, 1976, Ser. No. 701,588
Int. Cl.² B23P 19/02
U.S. Cl. 29—427 **10 Claims**



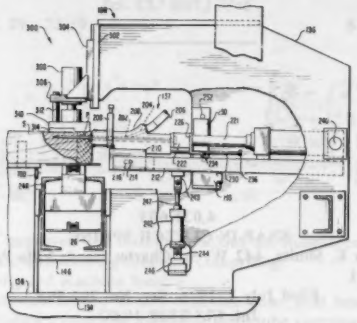
1. A method of removing a retaining ring from an automatic transmission, said automatic transmission having a housing including an annular slot, and a spring seat, comprising
   connecting a pair of elongated arms to said slot to hold said arms in position relative to said slot;
   outwardly biasing said elongated arms to hold said arms within position relative to said slot;
   moving a spring seat engaging member relative to said arms to contact said spring seat and thereby compressing said spring seat with said spring seat engaging member;
   removing said retainer ring.

2. An apparatus for disassembling a clutch piston assembly in an automobile automatic transmission, said assembly including a housing having positioned therein a piston, said piston held in said housing by a plurality of springs and a spring seat, said spring seat maintained in said housing by a retaining ring, said housing also including at least one slot fabricated on the peripheral surface of said housing, said apparatus comprising
   an elongated stem,
   a pair of resilient arms mounted on said stem,
   said arms including means for engaging said slot, and said stem including means for engaging said spring seat,
   said stem further including means for applying a compressive force to said spring seat when said apparatus is in operative position.

4,031,604
APPARATUS AND METHODS OF FABRICATING WOODEN FRAMES, PANELS AND THE LIKE

John Calvin Jureit, Coral Gables, Fla.; Howell J. Cotten, Keswick, Va.; Adolfo Castillo, and Roy Leutwyler, both of Miami, Fla., assignors to Automated Building Components, Inc., Miami, Fla.

Continuation of Ser. No. 466,176, May 2, 1974, abandoned, which is a division of Ser. No. 328,605, Feb. 1, 1973, Pat. No. 3,848,791. This application Dec. 12, 1975, Ser. No. 640,323
Int. Cl.² B27F 7/00, 7/02
U.S. Cl. 29—429 5 Claims



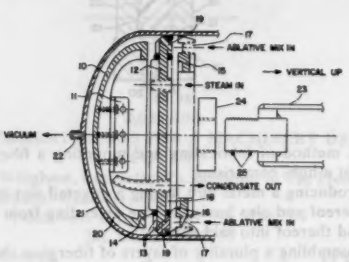
1. A method of fabricating a wooden panel having a pair of elongated plates and intermediate studs comprising the steps of:

disposing a stud between a pair of plates in substantially horizontal coplanar relation with the plates and stud ends lying on support surfaces between a pair of pivotally mounted nailing assemblies having one end thereof disposed at fixed elevations and other ends thereof disposed at one elevation, clamping the plates and corresponding ends of the studs against the support surface to ensure coplanar relation of the studs and plates, displacing said one end of said nailing assemblies toward said plates to engage the plates and clamp the plates against the stud ends in response to actuation of the nailing assemblies, actuating the nailing assemblies to drive a nail through each plate and into the corresponding end of the stud to secure the plates and the stud one to the other, automatically shifting the elevation of said other ends of said nailing assemblies from said one elevation to another elevation in response to completion of nailing at said one elevation, actuating the nailing assemblies when in said other elevation to drive a second nail through each plate and into the corresponding end of the stud at a like longitudinal location as the first nail thereby forming a partially completed frame, advancing the partially completed frame on an endless conveyor a predetermined distance such that said plates are laterally aligned between the nailing assemblies at the location therealong of a second stud, disposing a second stud between said plates said predetermined distance from said first stud, clamping the plates and corresponding ends of the studs against the support surface to ensure coplanar relation of the studs and plates, displacing said one end of said nailing assemblies toward said plates to engage the plates and clamp the plates against the stud ends in response to actuation of the nailing assemblies, actuating the nailing assemblies to drive a nail through each plate and into the corresponding end of said second stud to secure the plates and said second stud one to the other, automatically shifting the elevation of said other ends of said nailing assemblies from said one elevation to another elevation in response to completion of nailing at said one elevation, actuating the nailing assemblies when in said other elevation to drive a second nail through each plate and into the corresponding end of the second stud at a like longitudinal location as the first nail driven into the second stud.

4,031,605
METHOD OF FABRICATING COMBUSTION CHAMBER LINERS

Harold Thompson Couch, Columbia; Leonard Selwyn Cohen, West Hartford, and Lawrence Joseph Coulter, South Windsor, all of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 5, 1976, Ser. No. 712,128
Int. Cl.² B29C 5/04; B29D 3/02
U.S. Cl. 29—460 5 Claims



1. In a combustion chamber having a nozzle, an inner surface, an outer surface, and at least one domed region, a method of fabricating a liner on the inner surface of said combustion chamber comprising the steps of:

a. first attaching a wire mesh substrate screen to said inner surface of said combustion chamber so as to cover at least the domed region and the nozzle;

b. forming a cavity between said domed region and a parallel domed surface of a mold fixture assembled inside said combustion chamber;

c. forming a cavity between said nozzle and a mold fixture assembled inside said nozzle to form a surface parallel to said nozzle;

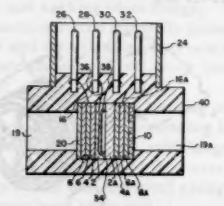
d. injecting a fluid curable polymeric material into said cavity between said domed surface and said domed region and into said cavity between said nozzle and said surface parallel to said nozzle; and

e. curing said fluid polymeric material into a firm solid affixed to said substrate screen.

4,031,606
METHOD OF MAKING A COMBINATION ION RESPONSIVE AND REFERENCE ELECTRODE

Eugene L. Szonntagh, Flourtown, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 552,284, Feb. 24, 1975, abandoned. This application Feb. 27, 1976, Ser. No. 661,958
Int. Cl.² B01J 17/00
U.S. Cl. 29—570 8 Claims



1. A method of making a combination electrode comprising

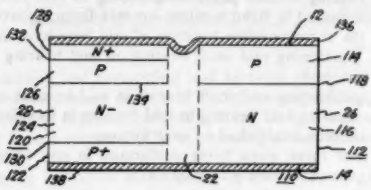
the steps of depositing a first metallic layer on a first surface area of an insulating substrate, depositing a first solid electrolyte layer on said metallic layer and depositing a pH glass layer on said electrolyte layer, depositing a second metallic layer on a second electrically isolated surface area of said insulating substrate, depositing a second solid electrolyte layer on said second metallic layer, depositing a second glass layer on said second electrolyte layer, said second glass layer having a coefficient of thermal expansion mismatched with respect to a coefficient of thermal expansion of said second electrolyte layer to produce differential expansion therebetween causing cracking of said second glass layer during a predetermined temperature cycle and exposing said electrode to said temperature cycle, said second metallic layer, said second electrolyte layer and said second glass layer being electrically isolated from said first metallic layer, said first electrolyte layer and said pH glass layer.

4,031,607

MINORITY CARRIER ISOLATION BARRIERS FOR SEMICONDUCTOR DEVICES

Harvey E. Cline; Thomas R. Anthony, both of Schenectady; Richard A. Kokosa, Skaneateles, and E. Duane Wolley, Auburn, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 474,033, May 28, 1974, Pat. No. 3,988,762. This application Apr. 29, 1976, Ser. No. 681,600
Int. Cl.² B01J *17/00*
U.S. Cl. 29—577 **57 Claims**



1. A process for forming a region of a selected minority carrier lifetime in a body of semiconductor material comprising the steps of:

a. selecting a body of single crystal semiconductor material having two major opposed surfaces comprising, respectively, the top and bottom surfaces thereof, a selected level of resistivity, a selected type conductivity, and a preferred planar crystal structure orientation of at least one of the major opposed surfaces, the planar crystal structure orientation is one selected from the group consisting of (111), (100) and (110);

b. orienting the body so that the vertical axis of the body is substantially aligned with a first axis of the crystal structure which is substantially perpendicular to the at least one major opposed surface having the preferred planar crystal structure orientation;

c. disposing at least one metal wire of selected metal composition comprising at least one material suitable for controlling the minority carrier lifetime in a body of semiconductor material on the surface having a preferred planar orientation, each metal wire having a preferred stable wire direction which is dependent upon the planar orientation of the major surface;

d. heating the body and the at least one metal wire to a temperature sufficient to form a melt of metal-rich semiconductor material on the major surface of the body;

e. establishing a thermal gradient substantially parallel with the vertical axis of the body and the first crystal axis of the material of the body;

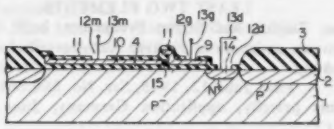
f. thermal migrating each melt into the body a predetermined distance from the one major surface parallel with the first crystal axis in the direction of the higher temperature of the thermal gradient to form a region of recrystallized semiconductor material of the body having solid solubility of the metal of the melt, as determined by the temperature of migration, and a level of minority carrier lifetime which is different from that minority carrier level of the material of the body.

4,031,608

PROCESS FOR PRODUCING SEMICONDUCTOR MEMORY DEVICE UTILIZING SELECTIVE DIFFUSION OF THE POLYCRYSTALLINE SILICON ELECTRODES

Ryoiku Togei; Akira Takei, and Kunihiko Wada, all of Kawasaki, Japan, assignors to Fujitsu Ltd., Japan

Filed Apr. 8, 1976, Ser. No. 675,196
Claims priority, application Japan, Apr. 11, 1975, 50-43388
Int. Cl.² H01L *21/28, 21/22, 29/78*
U.S. Cl. 29—578 **20 Claims**



1. A process for producing a semiconductor memory device, which device comprises:

a semiconductor material substrate having one particular conductivity type and comprising, on the surface thereof, a doped layer with an impurity of conductivity type opposite to said one particular conductivity type, one surface region of the substrate adjoining said doped layer being used as a gate region, and another surface region of said substrate adjoining said one surface region being used as a memory cell region;

a first insulating layer situated on said substrate over said gate region and said memory cell region;

a gate electrode consisting of a doped polycrystalline silicon, said gate electrode being situated on a part of said insulating layer over said gate region;

a memory cell electrode consisting of doped polycrystalline silicon, said memory cell electrode being situated on another part of said insulating layer over said memory cell region;

a resistive layer consisting of non-doped polycrystalline silicon layer, disposed on still another part of said insulating layer, located between and connected to said both electrodes;

wherein an electric charge of said opposite conductivity type is either injected from said doped layer though said gate region into said memory cell region or transferred from said memory cell region through said gate region to said doped layer, depending upon the electric potential level in said substrate, which level is established by an electric field created by each of said electrodes through said insulating layer;

said process comprising the steps of:

forming the first insulating layer on said substrate over at least said memory cell region and said gate region;

forming a first non-doped polycrystalline silicon layer on said first insulating layer;

forming a second insulating layer on said first polycrystalline silicon layer;

removing a part of said second insulating layer and said first polycrystalline silicon layer, thereby selectively placing these layers so as to be used for a masking portion and said memory cell electrode, respectively;

forming a second non-doped polycrystalline silicon layer so as to mask said first insulating layer over said gate region and to mask said masking portion of said second insulating layer;

removing the unmasked parts of both of said first and sec-

ond insulating layers, by an etchant which dissolves these layers, thereby exposing a part of said first and second polycrystalline silicon layers as well as a part of the substrate;

introducing an impurity of said opposite conductivity type into said exposed parts so as to dope the exposed polycrystalline silicon with the impurity and to form on the exposed part of the substrate said opposite conductivity type doped layer, wherein the masking portion of the second insulating layer protects the underlying part of the first non-doped polycrystalline silicon layer from the introduction of impurity so as to form a resistance layer therein

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4,031,609

METHOD FOR THE MANUFACTURE OF A SUPERCONDUCTOR WITH A SUPERCONDUCTIVE INTERMETALLIC COMPOUND CONSISTING OF AT LEAST TWO ELEMENTS

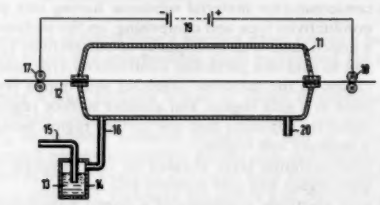
Günther Ziegler, and Sigrun Frohmader, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed June 12, 1975, Ser. No. 586,164

Claims priority, application Germany, June 14, 1974, 2428817

Int. Cl.² H01V *11/00*

U.S. Cl. 29—599 **12 Claims**



1. A method for the manufacture of a superconductor with a superconducting intermetallic compound consisting of at least two chemical elements comprising:

a. bringing a ductile structural part made of at least one element of the compound into contact with a second structural part containing a ductile carrier metal for the remaining elements of the compound;

b. subsequently supplying the remaining elements of the compound to the second ductile structural part at elevated temperature;

c. diffusing said remaining elements through said second structural part and reacting said remaining elements with the element in said first structural part to form said compound; and

d. wherein the improvement comprises said step of supplying comprising supplying the remaining elements to the second structural part through decomposition of alkyl compounds of said remaining elements.

4,031,610

METHOD OF ASSEMBLY OF DYNAMOELECTRIC MACHINES

Karnel Singh, North Olmsted; Thomas A. Denny, Lorain; Daniel P. Fritz, Elyria, and Orville C. Rising, LaGrange, all of Ohio, assignors to Airborne Mfg. Co., Elyria, Ohio

Filed Apr. 30, 1974, Ser. No. 465,687

Int. Cl.² H02K *15/14, 15/16*

U.S. Cl. 29—598 **7 Claims**

1. In a method of assembling a dynomoelectric machine including

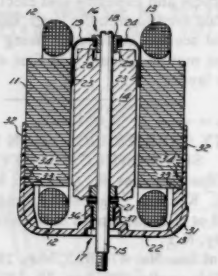
a stator having an axial bore,

a rotor having a shaft,

a rotor shaft bearing,

a bracket having a central opening for receiving said rotor shaft bearing with radially adjustable clearance and having at least two stator locating surfaces for engaging said stator and locating and supporting said bracket in a fixed predetermined positional relationship with respect to said stator and bridging said stator bore with said bore axis extended passing through said opening, the steps comprising

1. positioning and securing said bracket in said predetermined positional relationship with respect to a fixture



having surfaces corresponding to surfaces on said stator related to locating surfaces of said bracket and a bearing locator pin corresponding to said rotor shaft mounted in fixed position on said fixture coaxial with the corresponding location of said bore axis, and

2. positioning said shaft bearing on said bearing locator pin, and

3. positioning said shaft bearing in said bracket opening,

4. securing said bearing to said bracket in its relationship thereto established by said fixture,

the first three steps being performed in any appropriate sequence following by step (4).

4,031,611

METHOD OF MAKING PREINSULATED PIPE ASSEMBLY

Ben C. Johnson, Jr., San Marcos, Tex., assignor to Thermon Manufacturing Company

Division of Ser. No. 497,958, Aug. 16, 1974, Pat. No. 3,971,416. This application Dec. 15, 1975, Ser. No. 640,637

Int. Cl.² H05B *3/00*

U.S. Cl. 29—611 **8 Claims**

1. A method of installing a heating element in a preinsulated pipeline having a pipeline heater housing with a cavity therethrough and terminals for connecting the heating element to an energy source, comprising:

placing an end of the heater element into the heater housing cavity;

connecting a pull line to the heater element;

moving the heating element into the heater housing cavity until the heating element extends through the cavity by exerting a pulling force on the pull line connected to the heating element;

attaching the heater element to terminals for connecting the heater element to an energy source; and

sealing the ends of the heater housing cavity.

6. A method of preparing preinsulated pipe assemblies, and assembling same in the field, comprising the steps of:

first mounting a heater housing on each of a plurality of sections of pipe at a manufacturing facility remote from the field location where said pipe sections are to be installed;

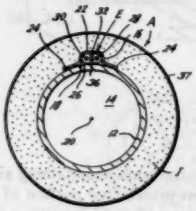
said heater housing for each section of pipe extending for substantially the full length thereof, but terminating short of each end;

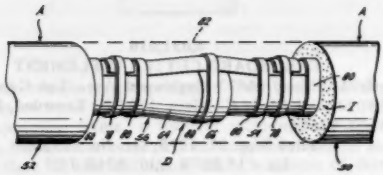
applying an insulation layer over each of said pipe sections

and heater housings therewith at said manufacturing facility;

said insulation layer on each section of pipe extending for substantially the full length of said heater mounting thereon, but terminating short of each end of said heater;

applying a protective jacket over the insulation on each section of pipe for substantially the full length thereof at a location remote from said field location;





assembling and connecting said sections of pipe at a field location remote from said manufacturing facility;

connecting adjacent ends of said heater housings together to form a continuous heater housing at the field location; and

applying insulation at the areas of the connection of said sections to thereby fully insulate the pipe sections and heater housings therewith.

4,031,612

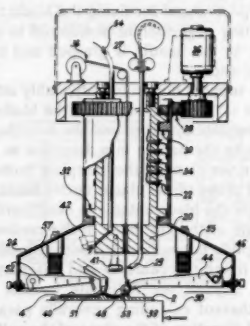
METHOD AND A DEVICE FOR THE INTERCONNECTION OF ELECTRONIC COMPONENTS

Gérard Nicolas, Grenoble, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 2, 1976, Ser. No. 663,250

Int. Cl.² H05K *3/00*

U.S. Cl. 29—625 **13 Claims**



1. A method for forming an electrical circuit by joining together different conductive zones preformed on an insulating base comprising the steps of

a. soldering an uninsulated end of a length of insulated wire to one of said zones,

b. advancing said wire toward a second zone and stripping insulation off the portion of the wire which will engage the second zone,

c. adhering the unstripped portion of the wire to the base as the wire is being advanced and when it contacts the base,

d. placing the stripped portion of the wire on the second zone,

e. soldering the stripped portion of the wire to the second zone, and

f. cutting the wire to separate the portion thereof extending beyond the second zone.

4,031,613

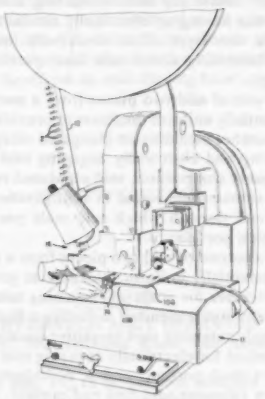
CLOSED BARREL TERMINAL APPLICATOR

Christopher Kingsley Brown, Camp Hill, and Donald Andrew Wion, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 4, 1976, Ser. No. 663,882

Int. Cl.² H01R *43/00*

U.S. Cl. 29—628 **14 Claims**



1. In an apparatus for applying terminals, each having an enclosed cylindrical barrel, to the end of wires including:

a crimping press comprising a crimping anvil and a crimping die movable relatively towards and away from said anvil; a crimping zone formed at the convergence of said anvil and said die; and terminal advance means for sequentially and laterally advancing equally spaced strip mounted individual terminals into said crimping zone from a first side and out of said crimping zone on an opposite second side, the improvement comprising:

a conical wire positioning funnel located in a first position adjacent to and spaced from said crimping zone with the axis of said funnel in alignment with a terminal barrel located within said crimping zone, said funnel being free to move from said first position to a laterally displaced second position in sequence with the movement of a terminal barrel out of said crimping zone on said second side, said funnel being also free to subseqently return from said second position to said first position, and hinge means allowing said funnel to open when said funnel is in the vicinity of said second position, whereby

one of said wires may be aligned with and inserted into an enclosed cylindrical terminal barrel by use of said funnel whereupon said barrel is crimped onto said wire and said wire is released from said funnel by said hinge means upon relative movement between said funnel and the crimped wire and barrel.

4,031,614

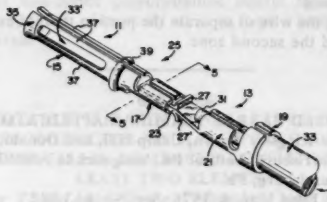
METHOD OF MAKING TWO-PIECE ELECTRICAL CONTACT

Richard Earl Gipe, Warren, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Nov. 19, 1975, Ser. No. 633,179

Int. Cl.² H01R 9/00

U.S. Cl. 29—630 A 5 Claims



1. A method for making a two-piece electrical contact adapted for electrically interconnecting a male pin and an electrical wire having an electrically conductive lead portion and at least one layer of an electrically insulative material formed substantially about said lead portion, said method comprising:

forming one of said two pieces from a metallic material of substantially uniform thickness to provide a female receptive member including an elongated reception portion for receiving and electrically engaging said male pin and a wrappable end portion, said elongated reception portion being substantially round in configuration and having an open end through which said male pin may enter said reception portion;

forming a second of said two pieces from a metallic material of substantially uniform thickness to provide a deformable member for positively retaining said electrical wire, said deformable member including a first end portion for positively retaining said insulative coating, an intermediate portion for electrically engaging said electrically conductive lead portion, and a multi-layered second end portion opposing said first end portion; and

joining said wrappable end portion of said female receptive member to said multi-layered second end portion of said deformable member to provide said two-piece electrical contact, said joining including the steps of wrapping said wrappable end portion substantially about said multi-layered second end portion, followed by welding said multi-layered second end portion to said wrappable end portion after said wrappable end portion has been substantially wrapped about said multi-layered second end portion.

4,031,615

METHOD OF MAKING CATHODES

Daniel Dumas, Saint-Priest, and Gérard Hudault, Saint-Jean-de-Maurienne, both of France, assignors to Societe des Electrodes et Refractaires Savoie, Paris, France

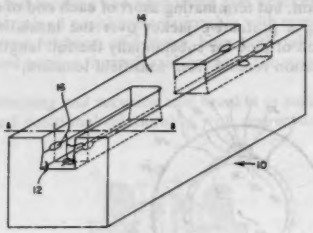
Filed July 7, 1976, Ser. No. 703,265

Claims priority, application France, July 17, 1975, 75.23065

Int. Cl.² H01R 9/02

U.S. Cl. 29—630 R 11 Claims

1. The method of making a cathode element for an electrolytic cell wherein current supplying steel bars are joined to blocks of carbon consisting of the steps of forming an elongated carbon block with means defining a channel extending along at least a major portion of its length, positioning at least one steel bar in spaced relation within and extending substantially the length of said channel and securing the same therewithin for sliding movement along a line generally parallel to the longitudinal axis of said block, anchoring said bar within said channel at at least one anchoring point to preclude transverse displacement of said bar with respect to said channel, and filling selected portions of the space between said channel



and said bar with a cast material while maintaining an expansion zone adjacent a different preselected portion of said bar to permit longitudinal expansion of said bar within said channel in response to variation in a temperature condition.

4,031,616

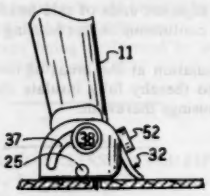
CARDBOARD CUTTER IMPLEMENT

Clyde A. Hines, 16573 Englewood Ave., Los Gatos, Calif. 95030, and Clyde C. Hines, 1103 N. Kenwood, Burbank, Calif. 91505

Filed Sept. 22, 1975, Ser. No. 615,689

Int. Cl.² B67B 7/30; B26B 3/08

U.S. Cl. 30—2 1 Claim



1. A cardboard cutting implement comprising in combination:

a handle;

a baseplate having a bottom planar surface with an aperture therethrough;

a planar cutter blade having one edge sharpened to form a cutting edge;

blade support means for fixing the blade to the handle with the cutting edge thereof positioned to contact and cut a surface as the handle is grasped and moved along said surface; and

baseplate support means for adjustably attaching said baseplate to said handle such that the blade extends through said baseplate aperture and the baseplate can be pivoted relative to the handle in a direction to change the angle between the plane of the baseplate bottom planar surface and the plane of the planar cutter blade thereby to adjust the angle the blade enters the cardboard surface and vary the angle of the cut made in the cardboard; and

a planar guide in combination with adjustable guide support means fixing the guide to said baseplate in a position to extend beyond the baseplate bottom surface with the plane thereof extending generally parallel to and in the general direction of the plane of the cutter blade with said guide support means being adjustable for varying the angle between the plane of the guide and the plane of the cutter blade.

4,031,617

ELECTRIC SHAVER WITH LONG HAIR TRIMMER

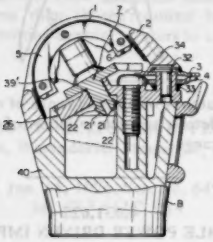
Yoshimasa Tanaka, Hikone; Hirozo Imai, Hirakata; Tadao Tsutsumi, Kadoma, and Takeshi Oda, Hikone, all of Japan, assignors to Matsushita Electric Works Ltd., Osaka, Japan

Filed July 12, 1976, Ser. No. 704,656

Claims priority, application Japan, July 12, 1975, 50-97263[U]

Int. Cl.² B26B *19/10*, *19/38*

U.S. Cl. 30—34.1 7 Claims



1. An electric shaver comprising an inner blade assembly of a plurality of inner blades supported as spaced on an inner blade supporting frame, a trimmer including a stationary trimming blade and a movable trimming blade slidable along lower surface of said stationary blade, a source of driving power, a reciprocal driving member supporting said inner blade assembly and coupled to said movable trimming blade, means for transmitting said driving power to said reciprocal driving member for reciprocally driving the same, a base member supporting thereon the reciprocal driving member, said stationary trimming blade being fixed to said base member, a shaver body case housing therein respective said elements, and a supporting frame for an outer blade having a plurality of hair introducing holes and cooperating with the inner blade assembly, said outer blade supporting frame being detachably mounted to upper part of said body case.

4,031,618

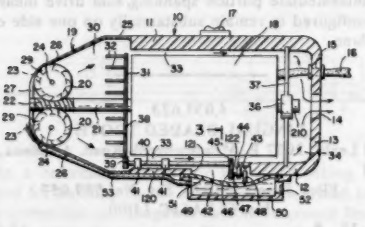
ELECTRIC SHAVER

Robin Mansfield, 14850 Oka Road No. 31, Los Gatos, Calif. 95030

Filed Jan. 15, 1976, Ser. No. 649,314

Int. Cl.² B26B *19/44*

U.S. Cl. 30—41.5 4 Claims



1. An electric dry shaver comprising a casing, a shaving head assembly arranged at the forward end of said casing, said shaving head assembly comprising a slotted cutter guard, a pair of cylindrical reel-type cutters each cylindrical reel-type cutter having an integral worm gear intermediate opposite ends thereof, trunnions at opposite ends, respectively, of each cylindrical cutter arranged to rotatably mount said cylindrical reel-type cutters in over-and-under spaced parallel relationship within said slotted cutter guard with the longitudinal axis of each cylindrical cutter at substantially right angles to the slots in said slotted cutter guard, a vacuum chamber in said shaving head assembly rearwardly of said cylindrical reel-type cutters, a motor mounted within said casing rearwardly of said vacuum chamber, said motor having a drive shaft arranged to extend forwardly into said shaving head assembly, a worm gear integral with the forward end of said drive shaft the said worm gear of said drive shaft arranged in driving engagement with the respective worm gears of said cylindrical reel-type cutters thereby to rotate said cylindrical reel-type cutters, a disc-like vacuum impeller afixed to said drive shaft within said vacuum chamber, a discharge port in the rear end of said casing, internal passage within said casing arranged to connect said vacuum chamber to said discharge port, said drive shaft arranged to rotate said disc-like vacuum impeller to create a vacuum force within said shaving head assembly.

4. An electric dry shaver according to claim 1 wherein said casing is constructed and arranged with lotion dispensing means comprising a chamber having a flexible wall, a conduit arranged to connect the lotion chamber to said shaving head assembly, and rotatable means arranged to be actuated automatically by said disc-like vacuum impeller to engage and deflect the said flexible wall of said lotion chamber thereby to dispense lotion therefrom to said shaving head assembly.

4,031,619

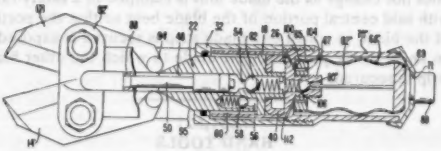
MANUAL, HYDRAULICALLY OPERATED TOOL

Jack T. Gregory, 390 Redwood Road, San Anselmo, Calif. 94960

Filed Jan. 19, 1976, Ser. No. 650,559

Int. Cl.² B26B *17/00*; B25B *7/22*

U.S. Cl. 30—180 19 Claims



1. An improved hydraulically operated tool of the type having a cylinder chamber closed at one end, a hydraulic ram within the cylinder chamber, a fluid reservoir, hydraulic pumping means fed by the reservoir for driving the ram out of the cylinder chamber, and work engaging elements operatively connected to the ram and cylinder chamber, wherein the improvement comprises mounting the pumping means in part within the ram, the pumping means including a fluid filled pump chamber within the ram, check valve means mounted in the ram, and wherein the tool further includes means for providing fluid communication between the reservoir and the check valve means and the pumping means further includes means mounted on the ram for pumping fluid from the reservoir through the fluid communication means and the check valve means into the cylinder chamber at the closed end to force the ram to move out of the cylinder chamber thereby operating the work engaging elements.

4,031,620

SHAVING SYSTEM

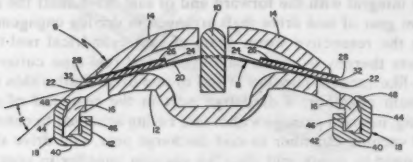
Edward E. Pomfret, Newbury, England, assignor to The Gillette Company, Boston, Mass.

Division of Ser. No. 536,484, Dec. 26, 1974, Pat. No. 3,958,692, which is a division of Ser. No. 381,768, July 23, 1973, abandoned. This application Jan. 28, 1976, Ser. No. 652,995

Claims priority, application United Kingdom, July 25, 1972, 34715/72; July 25, 1972, 34716/72; July 25, 1972, 34717/72

Int. Cl.² B26B *21/54*

U.S. Cl. 30—346.57 5 Claims



1. A disposable blade unit comprising a thin, transversely flexible blade which is apertured along its longitudinal center line and has its two longitudinal edges parallel and sharpened to cutting edges, a pair of blade strips each having a length substantially equal to that of the blade and a width less than half that of the blade and each sharpened along one longitudinal edge only, said pair of blade strips lying in a plane parallel to but spaced from that of the blade, and a pair of spacer strips each interposed between the adjacent faces of the blade and a respective one of the blade strips and bonded to both of said faces to secure the two blade strips to the blade with the blade strips disposed symmetrically on opposite sides of the longitudinal center line of the blade with their sharpened edges directed outwardly and extending parallel to the sharpened edges of the blade, said blade having an exposed central portion between the blade strips, the distance between the cutting edge of each blade strip and the longitudinal center line of the blade differing significantly from the distance between each cutting edge of the blade and the said center line, the outer edge of each spacer strip being spaced inwardly from the nearer of the adjacent cutting edges by a distance of at least 0.02 inch, and the cutting edge of each blade strip being spaced from the cutting edge of the blade by a fixed distance of from 0.03 to 0.08 inch, each edge of the blade and the edge of the adjacent blade strip being in a fixed geometrical relation does not change as the blade unit is clamped in a safety razor with said central portion of the blade bent so that the portion of the blade to which one blade strip is secured is exposed at an angle to the portion of the blade to which the other blade strip is secured.

4,031,621

HAND TOOLS

John Arlett, Camberley, England, assignor to Wilkinson Sword Limited, England

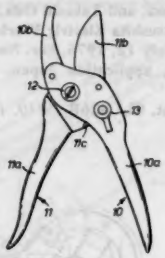
Filed July 16, 1976, Ser. No. 706,119

Claims priority, application United Kingdom, July 16, 1975, 29737/75

Int. Cl.² B26B *13/16*

U.S. Cl. 30—262 8 Claims

1. A hand tool comprising two members, two handles connected to the respective members and movable to move said members relatively to one another and a manually-operable catch having a shank mounted for rotation in one of said members and including a detent rotatable by the catch into and out of a position in which it prevents or restricts relative movement between the members, the shank being received in an aperture of said one member which is so shaped relative to the shank that over a predetermined range of rotation of the catch away from the position in which the shank was inserted into the aperture, the shank is prevented from withdrawal from the aperture, and said one member is so shaped that it permits the detent to be fitted to or removed from the shank



only when the catch is within said range of rotation and, after fitment of the detent, restricts rotation of the catch to said predetermined range.

4,031,622

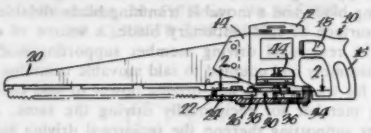
PORTABLE POWER DRIVEN IMPLEMENT

Carl J. Alexander, Moore Park, Mich., assignor to Wells Manufacturing Corporation, Three Rivers, Mich.

Filed Oct. 28, 1975, Ser. No. 626,296

Int. Cl.² B27B *19/04*; A01D *46/00*

U.S. Cl. 30—392 23 Claims



1. A portable power driven implement comprising:

housing means;

a tool member slidably supported by said housing means for reciprocating motion relative thereto, said tool member having an inner end;

motor means;

drive means adapted to be rotated by said motor means;

the axis of said drive means and the inner end of said tool member defining a plane passing therethrough;

output means rotatably driven by said drive means;

means linking said tool member and said output means for imparting reciprocating motion to said tool member in response to rotation of said output means, said linking means including:

one end portion connected to the inner end of said tool member;

another end portion connected to said output means traversing and intersecting said plane during rotation of said output means; and

an intermediate portion spanning said drive means and configured to remain substantially on one side of said plane.

4,031,623

LINGUAL BLADED TOOTH

Bernard Levin, 2077 E. Meadowbrook Road, Altadena, Calif. 91001

Filed June 23, 1975, Ser. No. 589,057

Int. Cl.² A61C *13/00*

U.S. Cl. 32—8 11 Claims

1. An insert for use as a lingual cusp of an anatomic artificial tooth, said insert comprising:

means for cutting and shearing food including at least one blade having a convex edge arched outward away from

the occlusal surface, said blade being formed of a substance harder than that of the artificial tooth; and means for securing the insert in the artificial tooth; whereby

the user is able to chew and shear food with forces substantially less than those required by natural teeth, thereby permitting denture wearers to chew food without distress.

4,031,624

EXTRACTION FORCEPS FOR UPPER MOLARS

Werner Heimann, Warendorfer Strasse 27, 4740 Oelde, Germany

Filed Jan. 15, 1976, Ser. No. 649,466
Int. Cl.² A61C 3/14
U.S. Cl. 32—62 10 Claims

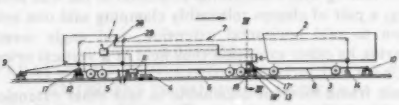
1. Extraction forceps for upper molars, comprising a pair of arms each having an end portion provided with a tooth-engaging jaw formed with claws defining a recess between themselves; and means connecting said arms for relative pivoting movement of said jaws about a pivot axis which extends perpendicularly to planes of closure of said jaws, whereby the forces required for extraction of one of said upper molars are inclined with reference to a skew plane passing through the recesses of said jaws.

4,031,625

REFERENCE SYSTEM FOR A TRACK WORKING MACHINE

Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H., Vienna, Austria

Filed Dec. 22, 1975, Ser. No. 643,511
Claims priority, application Austria, Feb. 7, 1975, 957/75
Int. Cl.² E01B 33/00
U.S. Cl. 33—1 Q 7 Claims



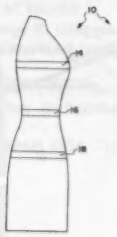
1. In a reference system for a track working machine mounted for mobility on the rails of a track, which reference system comprises an elongated flexible reference line having two end points and two intermediate measuring points, one of the intermediate measuring points being located in a corrected track section and another one of the intermediate measuring points being located in a track section to be corrected, bogies connected to the machine at each one of the reference line points, the two end point bogies each including means for securing the associated end point of the reference line thereto, and each of the two intermediate bogies including means to sense the position of the associated measuring point of the reference line with respect to the bogie, and drives holding each of the bogies under lateral pressure against a selected one of the track rails: the improvement of two clamping mechanisms associated with the reference line, each clamping mechanism being fixedly connected to a respective one of the intermediate bogies at the intermediate reference line points for selectively reducing and increasing the effective measuring length of the reference line between the end points thereof.

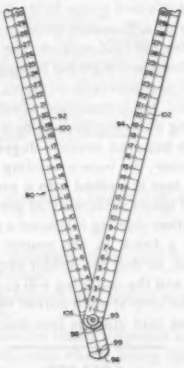
4,031,626

METHOD FOR DRAFTING GARMENT PATTERNS AND MEANS FOR PRACTICING SAME

Marjorie M. Dyal, 1934 S. Kenilworth, Berwyn, Ill. 60402

Filed Feb. 20, 1975, Ser. No. 551,268
Int. Cl.² A41H 3/06
U.S. Cl. 33—17 R 7 Claims





1. A method of making proportionally graded garment pattern component by forming a graphical representation having X and Y axes upon a receptor sheet, said method comprising the steps of: applying a first plurality of equispaced parallel vertical lines and a second plurality of equispaced parallel horizontal intersecting said first plurality and upon said receptor sheet to form the graphical representation, determining the spacing of said first plurality along the X axis by measuring around the figure and dividing the measurement so obtained by a factor of 4 to provide a first spacing factor, measuring the center front length of the figure along a line leading from the base of the neck of the figure to the ground and dividing said last-mentioned measurement by a factor of 4 deriving a tentative factor and adding a predetermined factor of 2 to the tentative factor to provide said second spacing

factor, the spacing between vertical lines being equal to the first factor and the spacing between horizontal lines being equal to the second factor, marking off a pair of rules with quarter-inch spaced graduations representing the first and second factors and carrying indicia correlating the graduation representing said factors to the measurements from which said factors are derived, marking off said distances along the respective X and Y axes and constructing the graphical representation, and thereafter applying universally applicable pattern layout instructions correlated in terms of said graphical graduations to the specific graphical representation whereby when the universal layout instructions are plotted on the graphical representation for any individual figure, patterned components layed out thereon will be properly proportioned for the said individual figure represented by said graphical representation.

4,031,627

LINE HOLDERS FOR BRICK AND CONCRETE BLOCK LAYING

Joseph Dar, 3036 S. Valentia, Denver, Colo. 80231

Filed July 12, 1976, Ser. No. 667,208
Int. Cl.² G01C *15/10;* **B43L** *7/00;* **B44D** *3/00*
U.S. Cl. 33—85 **1 Claim**

1. A pair of mason's line guide holders each of which comprises: a steel wire of a diameter small enough to be inserted into a course of freshly laid morter, the wire being bent to form a generally U-shaped member having two side legs and a base, all of which are generally straight, the side legs being substantially parallel, the connection of each of the side legs to the base comprising a corner formed by a bend in the wire of approximately two hundred seventy degrees so that a loop is formed at each corner, the base extending a distance such that as one of the side legs is pushed into a previously laid course of morter the base spans a plurality of previously laid courses of bricks and the other side leg is spaced a small distance from, and extends over a brick in the course of bricks which is presently being laid, so that the holder can pivot a slight angle about said one leg and the other leg will engage the top surface of said brick and the loop at each corner being formed in a size sufficient to receive said masons line therein.

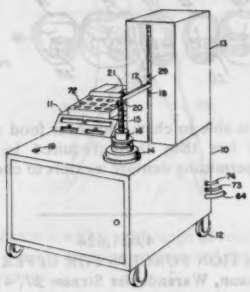
4,031,628

ELECTRONIC TOOL GAGE

Carl W. Kaesemeyer, 2605 Marlington Ave., Cincinnati, Ohio 45208

Filed July 8, 1975, Ser. No. 594,124
Int. Cl.² G01B *5/02*
U.S. Cl. 33—201 **1 Claim**

1. An electronic tool gage device for measuring the length and/or diameter at selected points of tools used in machine tools, the gage device comprising a chassis within a portable cabinet, a column affixed to said chassis, a tool socket affixed to said chassis for receiving tools whose length and/or diameter is to be measured, a slidable carriage adapted to be moved vertically on said column, air bearings mounted on said carriage to give friction free movement between the said carriage and said column, a counter weight to balance said carriage, said carriage supporting a horizontal slidable arm, said carriage having air bearings to give friction free movement between the said arm and said carriage, a first sensing device mounted on said carriage for measuring the length of tools



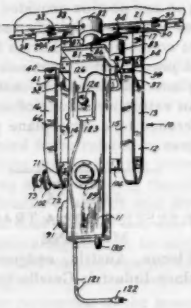
relative to said tool socket, a second sensing device mounted on said arm for measuring the diameter of tools relative to the center line of said tool socket, said sensing devices moving as a single unit, and means for visually displaying the length and/or diameter data.

4,031,629

APPARATUS FOR ESTABLISHING A LEVEL PLANE

George Paluck, 2156 W. Cuyler Ave., Chicago, Ill. 60618

Filed Mar. 30, 1976, Ser. No. 672,035
Int. Cl.² G01C *5/00;* **G01B** *11/26*
U.S. Cl. 33—290 **8 Claims**



1. A laser holding and adjusting bracket for supporting a laser on a wall moulding at a desired orientation and height comprising,

an angle member with one extension of the angle resting on and mating with a horizontal extension of the wall moulding, a pair of clamps releasably clamping said one extension to said horizontal extension, said angle member having its other extension thus held in a vertical orientation.

a main frame member attachable to said other extension.

a C-shaped member pivotally attached to said main frame member and pivotal about a first horizontal axis,

a generally vertical laser supporting frame member pivotally attached to said C-shaped member on a second horizontal axis which is at right angles to said first horizontal axis,

a means for adjusting said supporting frame about said first and second axis,

a laser housing,

an attachment member connected to said laser housing and adjustable attachment means connecting said attachment

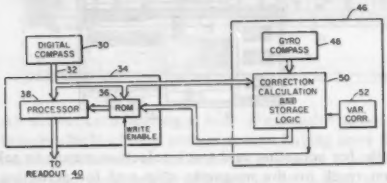
member to said generally vertical laser supporting frame member for vertical adjustment of said attachment member with respect to said supporting frame member.

4,031,630

CALIBRATION APPARATUS FOR AUTOMATIC MAGNETIC COMPASS CORRECTION

John T. Fowler, Winthrop, Mass., assignor to The Laitram Corporation, Harahan, La.

Filed June 17, 1976, Ser. No. 697,195
Int. Cl.² G01C 17/38
U.S. Cl. 33—356 9 Claims



1. Apparatus for providing a deviation-corrected output signal representative of an actual compass heading comprising:

a magnetic compass providing an output signal representative of an indicated compass heading;

means for storing deviation-correction signals representative of the deviation of the compass for each of a plurality of different indicated headings;

means for retrieving the stored deviation-correction signal corresponding with the indicated compass heading in response to the output signal from the compass;

means responsive to the retrieved deviation-correction signal and to the compass output signal for producing a deviation-corrected output signal representative of the actual compass heading; and

a calibration circuit, including

means for providing signals representative of the actual heading of the compass;

means for providing the compass output signal to the calibration circuit;

means responsive to the signals representative of the actual heading and to the compass output signal for providing signals representative of the difference therebetween; and

means for causing the difference signals to be stored by the storing means.

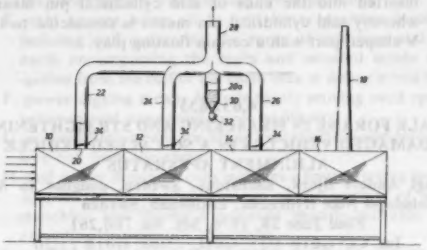
4,031,631

APPARATUS FOR REDUCING THE OPACITY OF THE EMISSIONS FROM WOOD DRYERS

John W. Robinson, Silsbee, Tex., assignor to Kirby Lumber Corporation, Houston, Tex.

Filed June 20, 1975, Ser. No. 588,762
Int. Cl.² F26B 19/00
U.S. Cl. 34—235 2 Claims

1. In a dryer for veneer having a plurality of heated zones through which the veneer moves as it is being dried and an exhaust outlet associated with each zone for venting gases and vapors from the zone, the improvement for reducing the opacity of the vented gases and vapors comprising a common stack, conduit means connecting each stack to the common stack, and means for insulating the conduit means to reduce



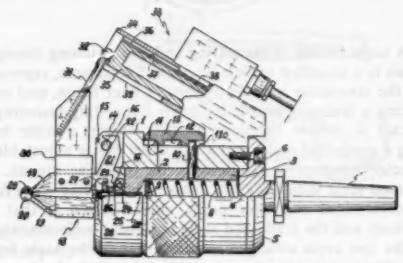
the heat loss of the vented gases and vapors as they travel to the common stack.

4,031,632

CENTERING AND MEASURING HEAD FOR MEASURING MACHINES

Georges Lendi, Crissier; Serge R. Ginggen, Renens, and Gildo Vadi, Cottens, all of Switzerland, assignors to Tesa S.A., Renens, Switzerland

Filed Sept. 29, 1975, Ser. No. 617,384
Claims priority, application Switzerland, Oct. 24, 1974, 14228/74
Int. Cl.² G01B 5/08, 7/12
U.S. Cl. 33—178 R 4 Claims



1. A centering and measuring head for measuring machines, comprising:

a. a tubular body;

b. a piston slidably mounted within said body for longitudinal movement therein;

c. a resilient means biasing said piston towards one end of said tubular body;

d. at least two transverse shafts disposed at said one end of said tubular body, said shafts being tangential with an imaginary circle concentric with the axis of the piston;

e. cylindrical pin means;

f. at least two centering keys disposed at said one end of said tubular body, each said centering keys formed of a contact arm assembled to a control arm in a substantially L-shape, and each of said control arms comprises two alternate V-shaped parts having ridges which are parallel to each other, and one of said V-shaped parts is oriented in a direction opposite to the piston head and applied against said shaft with its ridge parallel thereto, the other V-shaped part being oriented in the direction of the piston head and engaged on said cylindrical pin means parallel to the ridge thereof and bearing against the piston head;

g. means for connecting said control arms of said centering keys to said piston;

h. means for controlling the displacements of said piston against the bias of said resilient means; and

i. bar means connected to each of said control arms and inserted into the ends of said cylindrical pin means, whereby said cylindrical pin means is connected to the V-shaped part with a certain floating play.

4,031,633

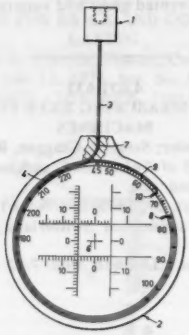
SCALE FOR USE IN MEASURING AND STRAIGHTENING DAMAGED VEHICLES IN A SO-CALLED VEHICLE ALIGNMENT APPARATUS

Bengt Anders Bjork, Eskilstuna, Sweden, assignor to Aktiebolaget Nike Hydraulik, Eskilstuna, Sweden

Filed June 28, 1976, Ser. No. 700,261

Int. Cl.² G01B *5/25*; **G01C** *15/08*; **G01B** *11/26*

U.S. Cl. 33—288 **3 Claims**



1. A scale for use in measuring and straightening damaged vehicles in a so-called vehicle alignment apparatus, especially when the measuring is made by using a laser beam, said scale including a fastening means for freely depending fastening of the scale at certain locations on the vehicle, a scale body having a graduated scale, and a line cross that is adjustable to a selected position in relation to the fastening means, the graduated scale indicating the distance of the line cross from a predetermined reference point, characterized in that the scale body and the graduated scale both have a circular shape with the line cross arranged in the center of the scale body, and in that an annular groove is cut in the scale body along the scale, a flexible band extending substantially radially from the scale body and which at its free end is connected to the fastening means and at its other end is provided with an index means said groove receiving said flexible band so that said flexible band so that said index means registers with said scale, the distance of the line cross from the reference point.

4,031,634

TEACHING DEVICE

Edwin Stastny, Santa Ana; Keith Rauch, Los Angeles, and Ronald Young, Simi Valley, all of Calif., assignors to Califone International, Inc., Los Angeles, Calif.

Filed Nov. 24, 1975, Ser. No. 634,493

Int. Cl.² G09B *5/04*; **G11B** *5/55, 25/04*

U.S. Cl. 35—8 A **17 Claims**

1. A teaching device employing cards, each card including printed indicia and a magnetic strip thereon comprising

a chassis;

a card path extending across said chassis;

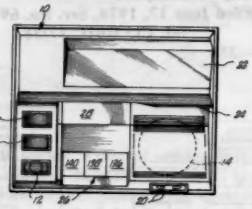
a magnetic recording and reproducing head assembly mounted on said chassis and selectively extending to said card path;

sound recording and reproducing means associated with said head assembly for recording on the magnetic strip and for reproducing that which has been recorded on the magnetic strip, including selector switch means for selecting from recording and reproducing modes;

means for moving the card along said card path for both advancing and retracting the card past said head assembly, said means for moving the card being activated to drive the card forward across said head assembly by insertion of the card in said card path;

track selection means for actuating said head assembly to select a track on the magnetic strip;

main control means for controlling said track selection means and said means for moving the card in said selector switch means, said main control means including first control means for actuating said means for moving the card to return the card to a starting position in said card



path, for actuating said track selection means to select a first track on the magnetic strip and for actuating said selector switch means to select the reproducing mode, second control means for actuating said means for moving the card to return the card to a starting position in said card path, for actuating said track selection means to select a second track on the magnetic strip and for actuating said selector switch means to select the reproducing mode, and third control means for actuating said means for moving the card to return the card to a starting position in said card path, for actuating said track selection means to select the second track on the magnetic strip and for actuating said selector switch means to select the recording mode.

4,031,635

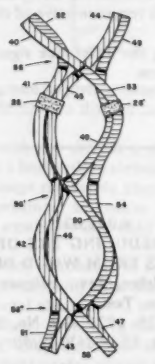
MANIPULATIVE CHROMOSOMAL MODEL

Edward E. Brandt, and Margaret K. Brandt, both of 208 Doak Drive, Greeneville, Tenn. 37743

Continuation-in-part of Ser. No. 568,024, April 14, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,279

Int. Cl.² G09B *23/36*

U.S. Cl. 35—20 **6 Claims**



1. A manipulative chromosome model to be placed on a flat surface for the study of chromosomal changes and processes which comprises: from two to four limp generally cylindrical subunits representing chromosome segments, each subunit

having a length of about 4 to about 8 inches and a diameter of about ¼ to ⅜ inch; a first half of a contact sensitive reusable fastener affixed to one end of each subunit substantially perpendicular to the length of the subunit; and a second half of the fastener affixed to the second end of each subunit substantially perpendicular to the length of the subunit whereby the subunits may be placed on the flat surface and serially joined to form a simulated chromosome.

4,031,636
CARD GRADING SYSTEM

John M. Hurt, Jr., P.O. Box 126, Smyrna, Tenn. 37167

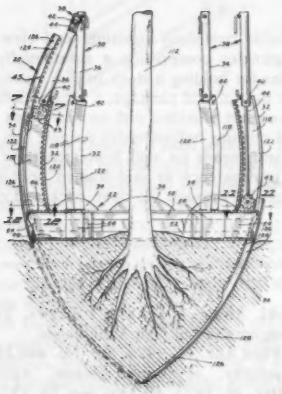
Filed Nov. 28, 1975, Ser. No. 635,864
Int. Cl.² G09B *3/08*
U.S. Cl. 35—48 A **9 Claims**

1. An answer card bearing at least one lengthwise column of true-false/multiple-choice answer spaces having lines thereon for marking between to indicate answers to a plurality of questions, said card being adapted to be folded along the length of said answer spaces so as to present, when viewed from above, a top rim edge which will offer a visible mark thereon when folded and compacted together in a stack with a plurality of said cards after said lines have been marked between and a key card at least one end of the stack with lines marked between to indicate correct answers.

4,031,637
TREE TRANSPLANTING MACHINE

Walbert A. Stocker, Jordan, Minn. 55352

Filed July 14, 1976, Ser. No. 705,095
Int. Cl.² A01B *13/00*
U.S. Cl. 37—2 R **11 Claims**



1. A machine for digging trees from the earth, said machine including:

A. a ring stand;

B. means for situating said stand in encircling relation to a tree to be transplanted;

C. a plurality of stanchions extending upwardly from said stand;

D. a plurality of digging spoons, each mounted for guided, sliding movement with respect to one of said stanchions and with respect to said stand between an upper position situated substantially out of the earth in parallel alignment with its stanchion, and a lower position wherein its lowermost portion meets with the lowermost portions of the other spoons when in said lower position;

E. said spoons when all in said lower position together isolating and separating the roots of said tree and the earth encompassing the roots and situated inside said spoons from the rest of the earth thus to define a tree ball;

F. power digging means for selectively moving each spoon between said upper and lower positions;

G. power lifting means for lifting said machine and tree and tree ball from the earth;

H. said power digging means includes a linear digging motor adapted to be anchored to an upper portion of each stanchion and having a powered linearly movable rod extending downwardly therefrom;

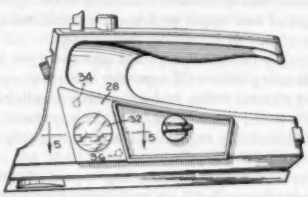
I. at least one generally cylindrical actuator rotatably mounted on the downward end of said motor rod; and

J. means operably assembled with said stanchion, said actuator and its digging spoon for causing said spoon to be moved at least twice the distance of movement of said actuator in response to movement of the actuator in the same direction.

4,031,638
STEAM IRON WATER GAUGE

William D. Ryckman, Jr., and Lester D. Little, both of Asheboro, N.C., assignors to General Electric Company, Bridgeport, Conn.

Filed Aug. 20, 1976, Ser. No. 716,103
Int. Cl.² D06F *75/06*
U.S. Cl. 38—77.2 **9 Claims**



1. An iron comprising:

a soleplate,

exterior wall means positioned above said soleplate in a fixed position relative to said soleplate, a selected wall portion of said exterior wall means having a vertical portion when the iron is positioned both horizontally and vertically,

a water reservoir within said exterior wall means at least partially defined by said selected wall portion, and

cover means secured and peripherally sealed to the outer surface of said selected wall portion and defining therewith a chamber intermediate said cover means and said selected wall portion, at least a portion of said cover means being transparent to permit said chamber to be viewed through said cover means,

said selected wall portion having at least two relatively small spaced-apart openings therein providing direct communication between said chamber and said water reservoir,

each opening being disposed out of view through said transparent portion,

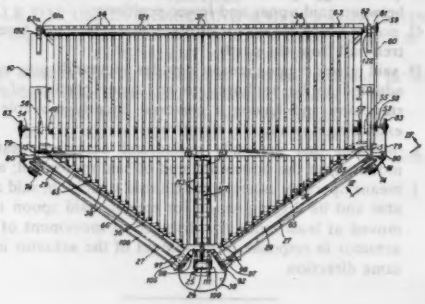
one of said openings communicating with a relatively low portion of said water reservoir and another of said openings communicating with a relatively high portion of said water reservoir

when said soleplate is disposed horizontally or vertically, whereby a range of water levels within said water reservoir may be determined by observing the water level in said chamber through said cover means when the iron is disposed both horizontally and vertically.

4,031,639
SPREADER-FEEDER FOR FLATWORK IRONER

Logan D. McCabe, Rte. 4, Box 8, Lubbock, Tex. 79413, and Stanley G. McCabe, 5302 11th, No. 146, Lubbock, Tex. 79416

Filed Oct. 26, 1976, Ser. No. 735,257
Int. Cl.² D06F 67/04
U.S. Cl. 38—143 29 Claims



1. In an apparatus for spreading and feeding flat laundered articles for ironing and like operations,

a main frame,

a pair of vertically spaced upper and lower power-driven central conveying belts supported on said main frame and extending along the central portion thereof,

means supporting the upper of said belts to establish a pressure nip between said belts,

spreader means mounted on said main frame on opposite sides of said upper and lower central belts and diverging therefrom as extending therealong,

a plurality of equally spaced power-driven carry-out belts extending from said spreader means at opposite sides of said central belts, and extending parallel to said central belts to the discharge end of the apparatus, and providing a substantially continuous article carrying surface for the length of the apparatus,

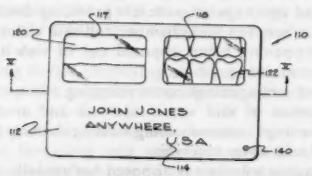
said spreader means including a pair of vertically spaced power-driven belts on each side of said central belts and extending in angular relation with respect to said central belts at equal angles with respect to said central belts, and

means maintaining pressure nips between said angularly extending belts for spreading and maintaining the laundered articles square with respect to said central belts as carried along the apparatus by said central belts.

4,031,640
IDENTIFICATION SYSTEM

Charles B. Hanna, Jr., 113-B Willow Run, Fayetteville, N.C. 28301, and William W. Coleman, 1646 Colony Road, Rock Hill, S.C. 29730

Filed Dec. 8, 1975, Ser. No. 638,466
Int. Cl.² G09F 3/02
U.S. Cl. 40—2.2 5 Claims



1. An improved identification system comprising:

a. a base of a predetermined thickness, said base having at least one radiograph receiving area therein and a personal data receiving area thereon;

b. at least one dental radiograph received in said at least one radiograph receiving area, said at least one dental radiograph having a thickness approximating that of said base;

c. a first sheet of transparent thermoplastic film disposed on one side of said base and radiograph and extending beyond the edges of same, said film being thermally bonded to said radiograph;

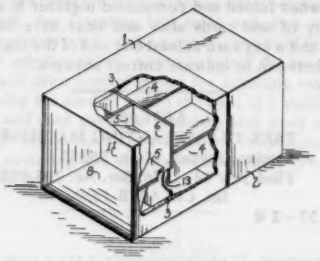
d. a second sheet of transparent thermoplastic film disposed on an opposite side of said base and said radiograph and extending beyond the edges of same, said second sheet of film being thermally bonded to said opposite side of said radiograph and to exposed surfaces of said first sheet of film to totally enclose said base and said radiograph, said thermal bonding between said sheets of film and said sides of said radiograph being sufficient to destroy said radiograph upon delamination of said film; and

e. tactile orientation means on one of said sheets of film.

4,031,641
COMBINED CONTAINER AND VIEWER PACKAGE FOR FILM TRANSPARENCIES

Jordan Ross Kaiser, Burying Hill Farm, Burrying Hill Road, Greenwich, Conn. 06830

Continuation of Ser. No. 611,175, Sept. 8, 1975, abandoned. This application July 6, 1976, Ser. No. 703,063
Int. Cl.² G09F 11/30
U.S. Cl. 40—63 A 9 Claims



1. A mailable combined container and view package for film transparencies comprising: a substantially rectangular shaped holder for holding a stack of film transparencies and forming one part of said package; a substantially rectangular shaped viewer part provided with an open back end and having a framed opening behind which a single film transparency is located, and means on said holder part for holding said single film transparency in said framed opening when said holder is inserted through the open back end of said viewer part.

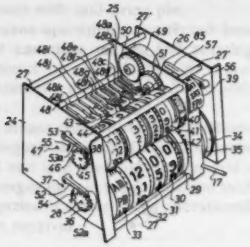
4,031,642
AUTOMATIC CALENDAR

Motomu Aoki, Atsugi, and Akira Ishikawa, Tokyo, both of Japan, assignors to Motomu Aoki, Japan

Filed Apr. 11, 1974, Ser. No. 460,182
Claims priority, application Japan, Apr. 14, 1973, 48-42438; Dec. 26, 1973, 49-339; Jan. 28, 1974, 49-10963
Int. Cl.² G09D 3/06
U.S. Cl. 40—111 5 Claims

1. A calendar comprising a units display drum having a periphery and displaying a plurality of spaced numerals in the sequence 0,1,1,2,3,4,5,6,7,8, and 9 at equal intervals on the periphery of the units display drum, a tens display drum having a periphery and displaying a plurality of spaced numerals in the sequence 0, 1, 1, 2, 2, and 3 at equal intervals on the periphery of the tens display drum, a calendar main shaft for concentrically supporting the units display drum and the ten's

display drum adjacent each other, support means for supporting said shaft, said support means having index means adjacent said drums for indicating a single numeral on each of said drums, stepping means coupling the units display drum to the tens display drum for advancing the tens display drum relative to the index means once when the numeral of the units display



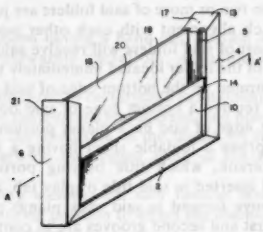
drum appearing at the index means changes from 9 to 0 once when the numeral of the units display drum appearing at the index means changes from 1 to 1, and rotating means for rotating the units display drum to move a numeral past the index means each day so as to display the days of a month in sequence.

4,031,643

SAND PICTURE FRAME

Charles P. Templeton, 104 Cleveland Road, Rossville, Ga. 30741

Filed May 14, 1976, Ser. No. 686,313
Int. Cl.² G09F *19/00*
U.S. Cl. 40—160 **8 Claims**



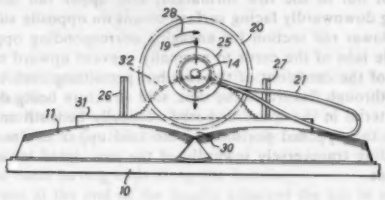
1. An Apparatus for creating a sand painting, comprising:
a frame comprised of a horizontally disposed bottom member and two vertically disposed side members connected to said bottom member at opposite ends thereof, said side members each having a first vertical groove;
a first backing plate which is mounted in said first grooves of said side members, having a vertical dimension of approximately one half the magnitude of the vertical dimension of said side members;
a transparent plate which is mounted in a second vertical groove in each of said side members, forward of said first vertical grooves, forming a lower portion of a cavity with said frame and said first backing plate, which is accessible from the top edge of said first backing plate for the introduction of sand therein,
a second backing plate which slidably engages said first grooves of said side members with a lower edge supported by said top edge of said first backing plate, having a vertical dimension of approximately one half that of said side members, for forming an upper portion of said cavity which is accessible from the top edge of said second backing plate for the introduction of said therein;
a horizontally disposed top member having opposite ends connected to the top ends of said vertical side members, and slidably engaging the top edge of said second backing plate and the top edge of said transparent plate, for sealing said sand within said cavity.
whereby designs may be conveniently formed by said sand in said lower portion of said cavity from the relatively close proximity of said top edge of said first backing plate.

4,031,644

PAGE-TURNERS

Peter Rogers, Addlestone, England, assignor to Possum Controls Limited, Aylesbury, England

Filed Apr. 12, 1976, Ser. No. 675,758
Claims priority, application United Kingdom, Apr. 18, 1975, 16174/75
Int. Cl.² G09F *11/00*
U.S. Cl. 40—104 A **4 Claims**



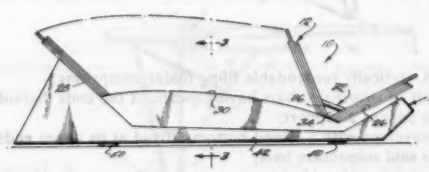
1. Apparatus whereby the pages of a book can be turned by remote control, comprising a mounting board for supporting a book and having a reversible electric motor mounted thereon, the motor having an output shaft extending therefrom over and generally parallel to the mounting board and being pivotally mounted for swinging movement of the output shaft through limited angles across and perpendicular to the mounting board, the output shaft having affixed thereto a friction-wheel for rolling across the pages of a book resting on the mounting board when the wheel is driven by the motor to thereby turn said pages, and a radial finger adjacent the wheel and coupled to the shaft through a slipping clutch whereby when the shaft reaches a limit of swing across a book the wheel can continue its rotation with the finger held against rotation by engagement with the mounting board.

4,031,645

TRAY TYPE CARD FILE

Lloyd E. Rose, North Smithfield, and Joseph P. Maruca, Coventry, both of R.I., assignors to Textron, Inc., Providence, R.I.

Filed Sept. 18, 1973, Ser. No. 398,439
Int. Cl.² G09F *11/06*
U.S. Cl. 40—68.6 **12 Claims**



1. Apparatus for supporting a multiplicity of cards of the type having a pair of parallel T-shaped slots formed along one edge thereof, each of which defines a pair of opposed flexible edge tabs, said apparatus comprising a unitary one piece structure molded of plastic material arranged to be supported on a horizontal surface, said structure including front and rear card supporting walls spaced apart to receive a multiplicity of cards therebetween in row formation, said front wall having rearwardly and upwardly facing surface means for supporting

a forwardmost card of the row along the forward face thereof in a forwardly and upwardly inclined position, said rear wall having forwardly and upwardly facing surface means for supporting a rearwardmost card of the row along the rearward face thereof in a rearwardly and upwardly inclined position, a pair of transversely spaced card supporting walls extending between the lower portions of said front and rear walls, said transversely spaced walls having upwardly facing surfaces disposed in a common plane for supporting the entire row of cards along the portions of the slotted edges thereof extending outwardly from the T-shaped slots therein, a lower rail section extending vertically upwardly along the inner portion of each of said transversely spaced walls between said front and rear walls, an upper rail section formed along the upper portion of each lower rail section and extending transversely outwardly therefrom in both directions, said rail sections having surface means facing in both lateral directions for engaging the slot defining edges of the cards to prevent transverse movement thereof out of the row formation, said upper rail sections having downwardly facing surface means on opposite sides of each lower rail section for engaging corresponding opposed flexible tabs of the cards to normally prevent upward movement of the cards out of the row but permitting such movement through flexure of the tabs, said structure being devoid of material in the space disposed vertically beneath and between the opposed portions of the said upper rail sections extending transversely inwardly of the associated lower rail sections.

4,031,646

SUSPENDIBLE FILING FOLDER

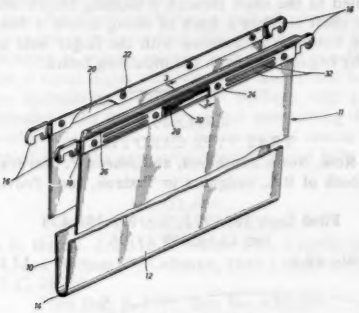
Chantal de Nouël, Paris, France, assignor to Societe d'Exploitation de la S.A. Henri Malsert, Lyon, France

Filed Oct. 21, 1975, Ser. No. 624,395

Claims priority, application France, Oct. 21, 1974, 74.35241

Int. Cl.² B42F *21/00*

U.S. Cl. 40—359 **7 Claims**



1. A vertically suspendable filing folder comprising:
- a pair of suspension bars having means at the ends thereof to engage a support;
- an envelope with a closed bottom affixed at its upper ends to said suspension bars;
- a non-magnetizeable housing attached to one of said suspension bars for mounting a magnetic element thereto;
- a permanent magnet disposed within said non-magnetizeable housing and surrounded thereby so as to have a surface thereof facing outwardly from said one of said suspension bars; and,
- a region of ferromagnetic material disposed facing outwardly on the other of said suspension bar in opposing position to said magnet for magnetically engaging the magnet of an adjacent folder.

4,031,647

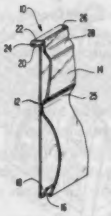
TITLE PROTECTOR

Reta Greenough Thomas, 101 S. Whiting St., No. 407, Alexandria, Va. 22304

Filed Feb. 10, 1976, Ser. No. 656,922

Int. Cl.² B42F *21/00*; B65D *27/00*

U.S. Cl. 40—359 **1 Claim**



1. A transparent folder for a document to be filed comprising:
- a single sheet of transparent plastic including a front planar portion having an upper edge and a bottom edge,
- a back planar portion coextensive and integral with said front planar portion and having an upper edge joined to said first-mentioned upper edge by a fold and both said front and said back planar portions having free bottom edges,
- a title display tab extending outwardly from said front panel and formed by sections of said front planar and rear planar portions adjacent to said fold,
- said back planar portion having a shallow groove parallel to and spaced from said upper edge a distance equal to the vertical distance the outer edge of said title display tab is spaced from said upper edge.
- whereby when two or more of said folders are juxtaposed in front-to-back alignment with each other said groove of the frontmost of said folders will receive said outer edge of said tab of the folder located immediately therebehind,
- a return lip formed on the bottom edge of said front planar portion to receive a bottom edge of said document and the bottom edge of said back planar portion, said document comprises a foldable sheet having a title bearing portion thereon, which title bearing portion may be folded and inserted in said title display tab, and
- a second groove formed in said back planar portion such that said first and second grooves are in contact with the rear face of said front planar portion.

4,031,648

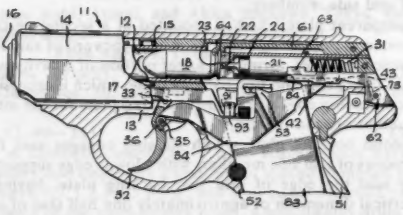
MAGAZINE SAFETY AND EJECTOR

Frank S. Thomas, 835 S. Cajon, West Covina, Calif. 91790

Filed Dec. 29, 1975, Ser. No. 644,437

Int. Cl.² F41C *17/08*

U.S. Cl. 42—70 A **9 Claims**



1. A magazine safety for a semi-automatic double action firearm having a magazine receiver, a cartridge magazine removeably fitted therein, and a cartridge extractor and wherein a firing pin is cocked and released for firing by a

trigger bar pivotably connected to a trigger and resiliently urged into releasable engagement with said firing pin, said magazine safety comprising:

camming means comprising an elongated arm pivotably attached at one of its ends to the frame of said firearm and engaging said trigger bar at a point intermediate the ends of said arm for movement of said trigger bar out of engagement with said firing pin;

resilient means operatively connected between said frame and said camming means and rotating said camming means about its axis of rotation thereby holding said trigger normally out of engagement with said firing pin; and

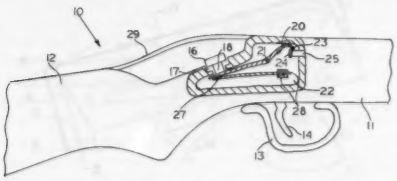
restraining means comprising a lip positioned on said magazine to engage the end of said arm remote from its said attached end and thereby restrain said camming means from disengaging said trigger bar and said firing pin, when said magazine is seated in its operational position in said magazine receiver.

4,031,649

AUTOMATIC SAFETY LOCK FOR FIREARMS

Walter B. Brock, 1101 Titus Towers, Ithaca, N.Y. 14850

Filed July 23, 1976, Ser. No. 707,934
Int. Cl.² F41C *17/04, 17/02*
U.S. Cl. 42—70 F **2 Claims**



1. In a firearm having a hand grip portion and a gun stock projecting rearwardly therefrom, an automatic safety lock comprising

a button mounted to reciprocate in an opening in said stock adjacent the forward end thereof, and positioned to register with the underside of the thumb on the underside of the thumb on the trigger hand of the operator of the firearm,

an operating member on said firearm movable from an inactive to a firing position to effect the discharge of a projectile from the firearm,

movable locking means interposed between said button and said operating member normally to hold said operating member releasably in its inactive position, and

resilient means urging said button and said locking means into first positions in which said button projects from said opening in said stock and said locking means is engaged with said operating member releasably to hold it in its inactive position,

said button being operative, upon being moved downwardly in said opening by the operator's thumb, to move said locking means to a second position against the resistance of said resilient means, thereby to release said operating member for movement to its firing position,

said locking means being a lever pivoted intermediate its ends for movement by said button from said first position, in which one end of said lever is engaged with said operating member to hold the latter in its inactive position, to a second position in which said one end of the lever is disengaged from said operating member,

said operating member being a reciprocable firing pin, having a circumferential flange forming a rim on one end thereof, and

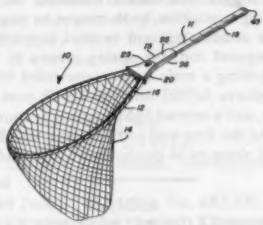
said lever having a hook on said one end thereof engageable over said rim to hold said pin in its inactive position when said button is in its first position.

4,031,650

RETRACTABLE NET

Samuel Joseph Popeil, Chicago, Ill., assignor to Popeil Brothers, Inc., Chicago, Ill.

Filed Jan. 9, 1976, Ser. No. 647,805
Int. Cl.² A01K *77/00*
U.S. Cl. 43—12 **16 Claims**



1. A retractable net comprising, in combination,

a handle,

a mesh net at one end of the handle,

a continuous flexible band reversibly flexed thereby forming a net hoop,

said band having ends along the handle,

means at the end of the handle adjacent the net to engage the band and shape the same when passed therethrough,

said net having means for securing the same to the band,

and means for advancing and retracting at least one end of the flexible band,

said means for advancing and retracting at least one end of the flexible band comprising a hollow member proportioned to slide along the handle,

said hollow member comprising separable members,

said band ends being locked in place when said members are secured together,

and means for securing said members together,

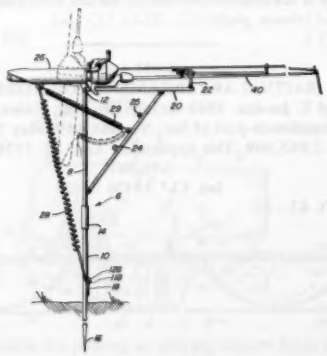
whereby a net hoop of increasing and decreasing opening is formed by advancing and retracting the flexible band, and whereby the band may be released to replace the netting by separating the hollow member.

4,031,651

FISHING ROD HOLDER WITH AUTOMATIC HOOK SETTER

Paul O. Titze, R.R. No. 2, Mitchell, S. Dak. 57301

Filed Mar. 30, 1976, Ser. No. 672,001
Int. Cl.² A01K *97/00*
U.S. Cl. 43—15 **5 Claims**



1. A fishing pole holder and hook setter comprising a vertical support post for insertion in the ground, a tubular sleeve

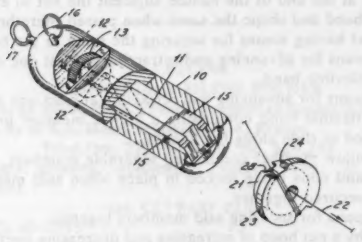
holder for the reception of the butt end of a fishing pole, said holder pivoted to the top of the vertical support post to rotate from a horizontal position to a vertical position, a horizontal linear support rod attached to the top of the vertical post and extending in a direction opposite to said sleeve holder's horizontal position, spring means extending between the free end of the sleeve holder and the support system, a U-shaped support mounted at the free end of the horizontal support rod for the reception of the intermediate portion of the fishing pole and line, a trigger mechanism mounted on said U-shaped support having a positive hook means to engage the fishing line, a brace connecting said vertical support post and said horizontal support rod, the spring means to bias the sleeve holder comprising a main spring connected between the free end of the sleeve holder and the lower post section of the vertical post, and a second lighter spring is connected between the brace and the free end of the sleeve which second spring may be used alone or in conjunction with said main spring.

4,031,652

FISHING LINE RELEASE MECHANISM

C. Evan Johnson, Onekama, Mich., assignor to Hitachi Magnetics Corporation, Edmore, Mich.

Filed Mar. 15, 1976, Ser. No. 667,097
Int. Cl.² A01K *91/00*
U.S. Cl. 43—43.12 **5 Claims**



1. A fishing line release mechanism comprising: a housing defining an elongated passageway having an open end; a permanent magnet positioned within said passageway having a pole facing said open end; manually adjustable means whereby the magnet is fixedly positionable in different axial positions within said passageway; and a release plate composed of magnetic material positionable within the open end of said passageway, said release plate being attracted to said magnet when positioned within said passageway, said release plate being threadable on a fishline and being movable to a position free of attraction by said magnet when the pull of said fishline is sufficient to overcome the attraction of said magnet for said release plate.

4,031,653

BAITING ARRANGEMENT FOR RODENTS

Carmel T. Jordan, 1040 Grandview Ave., Union, N.J. 07083

Continuation-in-part of Ser. No. 466,149, May 2, 1974, Pat. No. 3,965,609. This application Apr. 12, 1976, Ser. No. 676,361
Int. Cl.² A01M *23/20*
U.S. Cl. 43—61 **10 Claims**

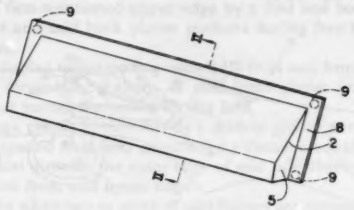
1. A bait feeding arrangement for rodents comprising, in combination, a modular entrance and exit housing with an opening through which a rodent may enter and leave; said housing having side walls with curved grooves formed therein; a curved closure member slidable within said grooves in said side walls; and a modular feeding housing connected to said entrance and exit housing and containing feed for said rodent, said curved closure member being in a first position closing said opening prior to entry into said entrance and exit housing by said rodent, said rodent entering said entrance and exit housing by moving on said curved closure member, said curved closure member sliding in said grooves toward a second position closing said opening when said rodent moves on said curved closure member, said rodent having a free passage into said entrance and exit housing after leaving said curved closure member in said second position, said rodent moving on said curved closure member to leave said entrance and exit housing, said curved closure member sliding in said grooves from said second position to said first position when said rodent leaves the interior of said entrance and exit housing.

4,031,654

INSECT TRAP

James R. Gray, P.O. Box 5094, Little Rock, Ark. 72205

Filed Jan. 26, 1976, Ser. No. 652,383
Int. Cl.² A01M *1/14*
U.S. Cl. 43—114 **16 Claims**



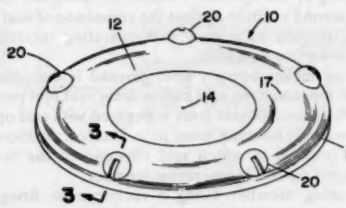
1. A trap for insects or other pests comprising: a panel having an adhesive surface, means supporting an edge of said panel away from a supporting surface so that said panel is disposed over and converges toward the supporting surface, and attractant in proximity to the portions of said panel nearest the supporting surface for means luring insects or pests to move under said panel and toward contact with said adhesive surface.

4,031,655

AERODYNAMIC SOUND-EMITTING AMUSEMENT DEVICE

Jose Ponciano, 1294 Southgate Ave., Daly City, Calif. 94015, and Thomas S. Bautista, 1730 Silliman St., San Francisco, Calif. 94134

Filed Jan. 30, 1976, Ser. No. 653,817
Int. Cl.² A63H *33/18*
U.S. Cl. 46—52 **8 Claims**



1. An aerodynamic amusement device, comprising:
a circular body provided with an outer surface, a central portion, a central axis, and a rim circumscribing the

central portion and curving downward therefrom, said body adapted to be thrown and to sail through the air after being thrown and to spin about the central axis as the body sails through the air; and

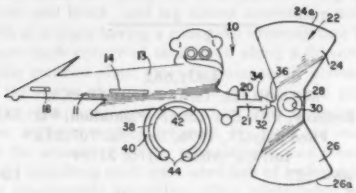
a plurality of whistle means for producing a sound symmetrically positioned upon the body a predetermined distance from the central axis, each whistle means having a chamber defined by side walls symmetrically arranged about a chamber axis that is positioned substantially normal to the body surface, a closed end and an opposite end portion forming a single aperture that communicates with the chamber, the aperture being positioned with respect to and above the outer surface of the body to allow air to pass across the aperture as the device sails through the air spinning about its central axis after being thrown.

4,031,656

PLASTIC TOY INTEGRALLY FORMED AND MOLDED WITH A PROPELLER AND MEANS FOR ATTACHING THE TOY TO A SUPPORT MEMBER

Sam Kupperman, Chicago, and Dennis I. Kupperman, Glenview, both of Ill., assignors to R B Toy Development Co., Skokie, Ill.

Filed Apr. 19, 1976, Ser. No. 677,919
Int. Cl.² A63H *33/40*
U.S. Cl. 46—53 **10 Claims**



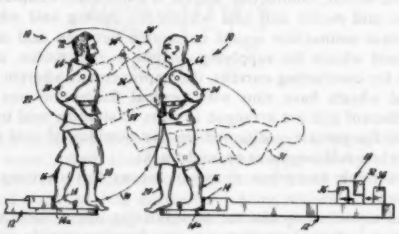
1. A toy integrally molded of a plastic material and comprising a body portion, an extension at one end of said body portion and a propeller all molded as an integral unit, said propeller adapted to be detached from said unit and manually mounted on said extension for rotation on said extension, a ring-like member molded as part of the body portion and extending below said body portion to permit attachment of said toy to a support and the like.

4,031,657

ACTION FIGURE

Dorland L. Crosman, Glen Ridge, N.J., and Charles M. Diker, New York, N.Y., assignors to Aurora Products Corporation, New York, N.Y.

Filed Feb. 5, 1976, Ser. No. 655,564
Int. Cl.² A63H *13/06*
U.S. Cl. 46—142 **20 Claims**



1. In a human-like figure actuable to simulate various movements of the human being; said figure including a head, a body, a pair of arms depending from opposite sides of said body, and a pair of legs depending from opposite sides of said body; at least one means for moving a leg and simultaneously producing movement of the body of said figure comprising:

body mounting means for supporting said body for movement about a first axis;

leg mounting means for moving said leg relative to said body about a second axis; and

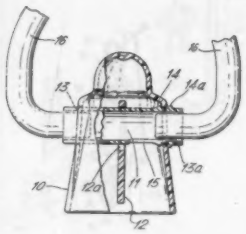
motion-transmitting means coupled to said leg mounting means and responsive to an applied force for rotating said leg about the second axis and displacing said leg with respect to said body mounting means, and simultaneously pivoting said body about the first axis to simulate the movement of a human being.

4,031,658

CHILD'S RATTLE

David William Chisnall, Thirlestane, Stadhampton, Oxfordshire, England

Filed June 7, 1976, Ser. No. 693,556
Claims priority, application United Kingdom, June 11, 1975, 25088/75
Int. Cl.² A63H *5/00*
U.S. Cl. 46—191 **4 Claims**



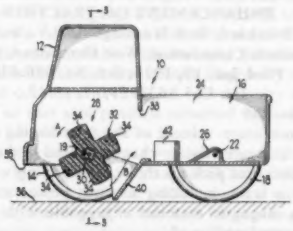
1. A child's rattle comprising a bell-like member, two oppositely disposed apertures through the wall thereof on a common axial line near to its closed end, a tubular shaft passing through said apertures and member, means at an end of said shaft lockingly engaging the member at one aperture, and a clapper having an eye through which said shaft passes within the member.

4,031,659

TOY PICK-UP VEHICLE

Albert G. Keller, Chicago; Donald F. Nix, Hanover Park, and Howard J. Morrison, Deerfield, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Nov. 10, 1975, Ser. No. 630,719
Int. Cl.² A63H *17/00*
U.S. Cl. 46—204 **4 Claims**



1. A toy vehicle for picking up playing objects from a supporting surface, comprising:

a vehicle body having a lower object inlet means generally at the front thereof;

front and rear wheel means on the vehicle for supporting the vehicle for movement over the supporting surface;

a paddle wheel rotatably mounted on the vehicle body for conjoint rotation with said front wheel means for engagement with objects on the supporting surface and moving the objects therewith;

a rear receptacle disposed behind said paddle wheel and generally above said rear wheel means; and

conduit means between said paddle wheel and said receptacle including a direct opening in the vehicle body between the paddle wheel and the rear receptacle and a lower deflector member extending beneath said opening in proximity with the surface;

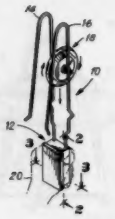
said paddle wheel being fabricated substantially of resilient, soft spongy material to provide friction and yieldability as the paddle wheel rotates to engage the objects for movement upwardly through said opening into said rear receptacle.

4,031,660

ILLUMINATED ACTION TOY

Tommy Chen, 10 Manwan Road 3 A, Kowloon, Hong Kong

Filed Oct. 12, 1976, Ser. No. 731,800
Int. Cl.² A63H *33/26*
U.S. Cl. 46—228 **15 Claims**



1. An illuminated action toy comprising a pair of substantially parallel rails made of magnetic and electrically conductive material, each of said rails having two outwardly flaired sections facing two outwardly flaired sections in the other rail, a moving element having an axle whose ends are magnetized and electrically conductive for rotating and moving along said rails and for reversing direction at the flaired sections thereof, and battery pack means secured to said rails for spacing said rails from each other to accommodate said axle therebetween and for applying a potential difference to said rails, said moving element including bulb means connected between the two ends of said axle whereby said axle controls both attraction of the moving element to the rails and the flow of current from one rail through the bulb to the other rail.

4,031,661

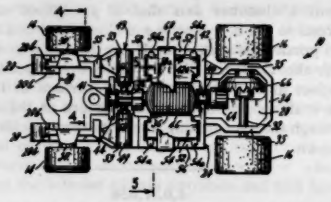
MINIATURE VEHICLE WITH MAGNETIC ENHANCEMENT OF TRACTION

Robert B. Bernhard, Port Washington, N.Y., assignor to Aurora Products Corporation, West Hempstead, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,426
Int. Cl.² A63H *29/12, 18/12*
U.S. Cl. 46—249 **20 Claims**

1. In a miniature vehicle of the type having a supporting chassis, at least one driving wheel mounted to the chassis, and a pair of electrical pick-up shoes, said driving wheel adapted to engage a track including electric power means therein made of a magnetic material engageable with said pick-up shoes, the combination of:

an electric motor mounted in said chassis for powering said at least one driving wheel, including a rotatably mounted drive shaft extending axially along the length of said vehicle and coupled to said at least one driving wheel, an armature coaxially mounted on said drive shaft having a plurality of windings, a pair of magnet assemblies mounted in said chassis on opposite sides of said armature and forming the stationery magnetic component of said motor, each of said magnet assemblies including a magnet mounted in said chassis with no portion of said chassis between the bottom of said magnet assemblies and the electric power means of said track; and



means for coupling said armature to said pick-up shoes for providing electric power to said motor;

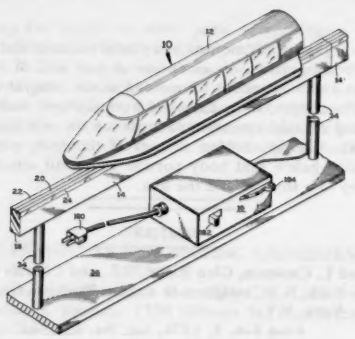
said magnet assemblies and said electric power means cooperating when said miniature vehicle is in said track to provide a magnetic force holding said vehicle to said track, thereby increasing the traction of said at least one driving wheel on said track.

4,031,662

MONORAIL TRAIN AND TRACK

Alan S. Beshany, P.O. Box 15065, Plantation, Fla. 33318

Filed July 21, 1976, Ser. No. 707,272
Int. Cl.² A63H *19/10, 21/04*
U.S. Cl. 46—257 **10 Claims**



1. In a model monorail train including an engine having an electric motor, conductive wheels, a drive train coupled between said motor and said wheels for driving said wheels, electrical connection means connected between said motor and said wheels for supplying current to said motor, and a track for conducting current, the improvement wherein:

said wheels have rims with vertical flanges on one side thereof and are arranged in pairs to straddle said track;

said flanges are positioned on the outsides of said track when said engine is on said track;

said track comprises monorail means for receiving said wheels;

said monorail means has an insulating upper surface and two L-shaped conductor means forming outside corners of said upper surface for engaging both said rims and said flanges of said wheels; and

said L-shaped conductor means each have a horizontal leg for engaging the rims of corresponding wheels and a

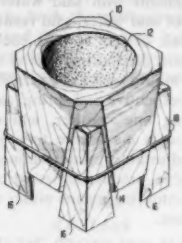
vertical leg for engaging the flanges of corresponding wheels.

4,031,663

WOODEN BLOCK PLANTER WITH SUPPORTING LEGS

Ronald M. Brunk, Rte. 1 Box 192, Greenwood, Va. 22943

Filed May 24, 1976, Ser. No. 689,629
Int. Cl.² A01G 9/02; B65D 1/00
U.S. Cl. 47—66 3 Claims



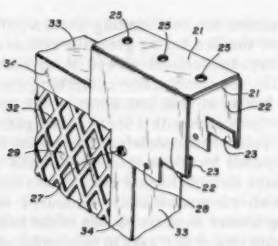
1. A wooden planter comprising initially a substantially solid rectilinear block of wood having a recess in the upper surface thereof for the reception of a plant and leg means formed from said block, said leg means comprising substantially identical wedges having a triangular cross-section which are cut from each corner of said block along a downwardly and inwardly inclined plane extending diagonally across each corner of the block, the cutting forming associated pairs of inclined planar surfaces, each pair of inclined surfaces comprising one inclined surface on each leg and one inclined surface on the associated corner of said block, and means for securing said legs along each associated pair of inclined planar surfaces in downwardly depending offset relationship to said block.

4,031,664

SUSPENSION SYSTEM FOR SOUND ABSORPTION PANELS

Alan C. Wendt, Barrington, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Jan. 20, 1976, Ser. No. 650,632
Int. Cl.² E05D 13/02
U.S. Cl. 49—409 13 Claims



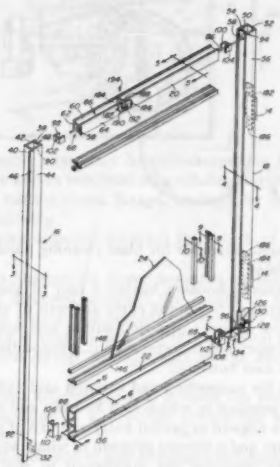
1. A horizontally movable sound absorption wall comprising one or more sound absorption panels supported by a top frame member; a hanger attached to the top frame member; a supported track; guiding means for guiding movement along the track; and connecting means for attaching the hanger and the guiding means to enable the panels to be moved in a path along the track; wherein the panel frame member has one or more depending lip portions; and wherein the hanger has a horizontal portion, one or more vertically depending connection portions depending vertically downward from the horizontal portion with said vertically depending connection portions having one or more support portions comprising inwardly and upwardly formed portions of the connection portion.

4,031,665

ADJUSTABLE ENTRANCE DOOR

Harold B. Abramson, 30 Stearns Road, Brookline, Mass. 02146

Filed Dec. 8, 1975, Ser. No. 638,370
Int. Cl.² E06B 1/04, 3/00
U.S. Cl. 49—501 10 Claims



1. An adjustable entrance door comprising:

a. a plurality of extruded sections including a lead edge stile, a hinge stile, a top rail and a bottom rail;

b. means for interconnecting said sections, said interconnecting means including a pair of tie rods, one of said tie rods connecting said lead edge stile, said hinge stile and said top rail, said other tie rod connecting said lead edge stile, said hinge stile and said bottom rail, said connected sections defining a substantially rectangular open frame;

c. a substantially rectangular panel configured to be received within said frame;

d. means for mounting said panel to said frame, said mounting means including a first pair of shims and a second pair of shims, one shim of said first pair disposed between one of said stiles and said panel adjacent a first corner of said frame, the other shim of said first pair disposed between one of said rails and said panel adjacent said first corner, one shim of said second pair disposed between the other of said stiles and said panel adjacent a second corner of said frame, the other shim of said second pair disposed between said other of said rails and said panel adjacent said second corner, said first corner diagonally opposite said second corner, said first and second pairs of shims positioned so that said panel is mounted oblique to the inner faces of said rectangular frame;

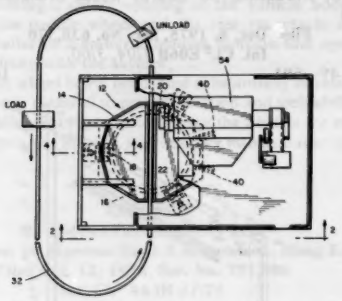
e. first adjusting means mounted to said top rail in engagement with a top edge of said glass panel, said first adjusting means operative to cause relative vertical movement between said lead edge stile and said hinge stile; and

f. second adjusting means mounted to said bottom rail, said second adjusting means constrained against free movement relative to said bottom rail and constrained for forced movement relative to said bottom rail, said second adjusting means operative to vary the height of said door when moved relative to said bottom rail.

4,031,666
ROTARY DOOR BLAST CHAMBER

Curtis C. West, Mishawaka, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.

Filed Aug. 30, 1976, Ser. No. 718,616
Int. Cl.² B24C 3/14
U.S. Cl. 51—419 8 Claims



1. A sealable chamber for blast cleaning parts with particulate comprising:

a. an enclosed housing having a pair of aligned openings therethrough to permit entry and exit of said parts;

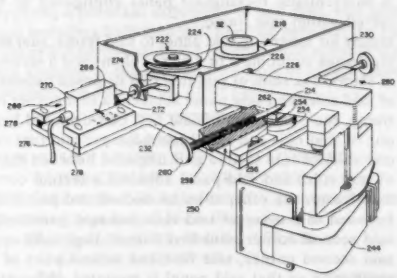
b. a hollow cylinder disposed within said housing having a pair of openings therethrough corresponding to the openings in said housing;

c. means for supporting and rotating said cylinder between a first position in which said housing and cylinder openings are aligned to permit entry and exit of parts from said chamber and a second position in which said housing and cylinder openings are misaligned to seal the chamber against the escape of said particulate.

4,031,667
APPARATUS FOR CONTOURING EDGE OF SEMICONDUCTOR WAFERS

William H. Sehestedt, Santa Clara, Calif., assignor to Macronetics, Inc., Sunnyvale, Calif.

Filed Mar. 29, 1976, Ser. No. 671,392
Int. Cl.² B24B 9/00
U.S. Cl. 51—105 R 10 Claims



1. Apparatus for contouring the edge of a semiconductor wafer, comprising

rotatable holding means for receiving and releasably holding one side of said wafer while leaving the edge of said wafer free from obstruction, and rotating said wafer generally about its center,

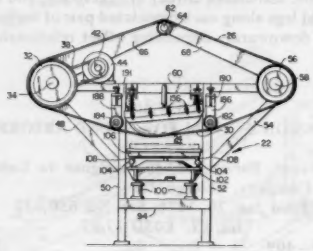
contouring means for removing sharp corners from the edge of said wafer, said contouring means comprising a rotating grinding wheel which is axially parallel to said rotating holding means and is mounted for movement toward and away from said holding means and a wafer held thereupon, said grinding wheel having a generally V-shaped, radially inwardly extending circumferential groove, whereby engagement between the edge of the rotating workpiece and the grinding wheel groove may serve to bevel or round any sharp corners adjacent the edge of the workpiece,

biasing means resiliently urging said contouring means against said wafer edge with a preselected and adjustable force such that said grinding wheel will be maintained in grinding engagement with said wafer edge during the entire rotation of said wafer, said resilient biasing means comprising a pair of coil springs each having one end connected to said contouring means and the other end connected to a mount which is adjustably movable longitudinally of its respective coil spring, said coil springs and mounts opposing one another, whereby said opposed springs and mounts may serve to urge said contouring means to an adjustable predetermined position and to exert an adjustable, predetermined force against displacement of said contouring means either side of said predetermined position.

4,031,668
SANDING MACHINE FOR ANATOMICALLY CONTOURED WOODEN CHAIR SEATS AND THE LIKE

Robert A. Lasko, deceased, late of Winsted, Conn. (by Ruth Lasko, administratrix), and Claud T. Miller, Statesville, N.C., assignors to Hitchcock Chair Company, Riverton, Conn.

Filed Feb. 19, 1974, Ser. No. 659,322
Int. Cl.² B24B 21/06, 21/16
U.S. Cl. 51—137 10 Claims



1. In a machine for belt sanding anatomically contoured chair seats and the like having generally concave depressions therein with arcuate surfaces viewed along each of two perpendicular axes, the combination comprising a work station, a sanding belt having at least one abrasive side and which follows a closed loop path with a longitudinal pass adjacent the work station, pulley and associated drive means for supporting the belt at spaced locations internally of the loop and for driving the same through its said path, means for supporting a chair seat with its anatomically contoured surface to be sanded facing toward an abrasive side of the belt at said work station and with one of said axes in substantial alignment with said longitudinal belt pass, said chair seat support means being movable toward and away from and generally perpendicular to the plane of said longitudinal belt pass to cause a chair seat thereon to selectively engage the belt, and said support means also being movable laterally with respect to and generally parallel to the plane of said longitudinal belt pass along the other of said axes whereby the chair seat can be progressively sanded in movement across the belt, a pneumatically inflatable generally pillow-like resilient back-up member having a generally convex pressure surface with both lower side and end edge portions having a rounded configuration, said member being disposed at said work station on a side of said belt

opposite said chair seat, a regulable source of air under pressure in communication with the interior of said resilient member and serving to inflate the same, said member when inflated being resilient along each of said axes and serving to slidably engage the belt and urge the same toward the seat thereby causing the belt to conform to and sand said contoured seat along the arcuate surfaces of each of said axes, and at least one guide roller disposed adjacent the sanding belt on the same side as said resilient back-up member but spaced longidutinally from said member, said roller being mounted for adjustment toward and away from the belt whereby to vary the belt angle relative to both the resilient member and a chair seat being sanded and thus to control belt engagement with the seat and sanding thereof in an area adjacent the area of engagement between the resilient member and the belt.

4,031,669

AUTOMATIC PROFILING MACHINE

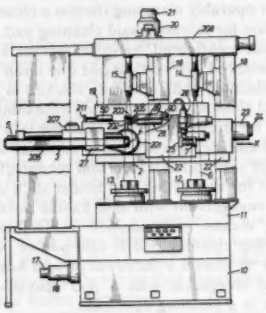
Sakae Koide, Tokyo, and Shigeo Aoki, Habikino, both of Japan, assignors to Tahara-Shoyei Engineering Co., Ltd., Osaka, Japan

Filed Nov. 13, 1975, Ser. No. 631,550

Claims priority, application Japan, Nov. 19, 1974, 49-133365

Int. Cl.² B24B *17/00, 19/14, 21/16*

U.S. Cl. 51—142 **14 Claims**



1. An automatic profiling machine comprising means for rotating a model, means for rotating a workpiece in synchronism with the rotation of the model, a stylus capable of relative movement with respect to the model in a direction perpendicular to the axis of rotation of the model and adapted for contact therewith, means for detecting a displacement of the stylus from its neutral point as it contacts the model, means for detecting a distance between the center of the stylus and the center of rotation of the model, means for controlling the rotational speed of the model and the speed of relative movement between the model and the stylus in accordance with the detected values of said displacement and distance so that the point of contact between the stylus and the model moves along the contour of the model with a given speed, a tool for machining the workpiece, the tool being disposed n the same positional relationship as that between the model and the stylus, means for causing a relative movement between the tool and the workpiece in a manner similar to the relative movement between the stylus and the model, means for rotatably holding a contact segment of the stylus against the model so that the segment is in exact conformity to the surface thereof, means for detecting a rotation of the contact segment, and means for causing a skew of the tool in accordance with the detection of the rotation.

4,031,670

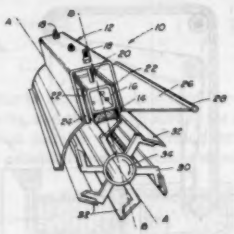
ADJUSTABLE SHARPENER FOR SELF-SHARPENING FEED CHOPPING KNIVES

C. J. Murphy, Rte. 1, Abilene, Kans. 67410

Filed Dec. 29, 1975, Ser. No. 644,925

Int. Cl.² B24B *3/36*

U.S. Cl. 51—250 **7 Claims**



1. An adjustable sharpener for self-sharpening feed chopping knives, the knives mounted on a rotating cutter head, the knives used in cutting crops, forage, ensilage, or the like, the sharpener comprising:

a stone housing disposed adjacent the length of the cutter head;

an elongated sharpening stone mounted in said housing, said stone disposed adjacent the length of the cutting edge of the knives and tangent thereto, said stone laterally secured in said housing to prevent lateral movement of said stone as the cutting edges of the knives rotate thereby;

adjusting means attached to said housing for manually adjusting said stone in a direction toward the axis of the cutter head;

biasing means attached to said housing and disposed against said adjusting means for biasing said adjusting means so that said stone is kept in adjustment; and

an elongated cutter bar mounted in said housing and disposed adjacent said stone, an edge of said cutter bar disposed adjacent the length of the cutting edge of the knives and tangent thereto;

said adjusting means and said biasing means allowing movement of said stone in a direction away from the axis of the cutter head when a foreign object becomes trapped between said stone and the cutting edge of the knives.

4,031,671

APPARATUS FOR DELIVERING FLUID GRINDING MATERIAL

Henryk N. Frosz, 54 Tranumparken, Broendby Strand, Denmark

Filed Feb. 9, 1976, Ser. No. 656,363

Int. Cl.² B24B *57/00*

U.S. Cl. 51—263 **6 Claims**

1. A grinding or polishing apparatus, comprising:

a rotatable grinding or polishing element;

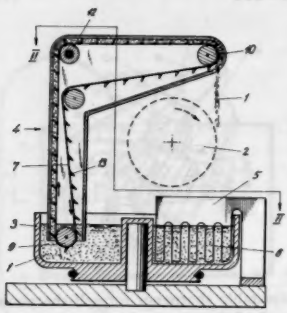
a cup disposed beneath said rotatable element and including a bottom wall and a generally vertical peripheral wall, said cup being mounted for rotation about a generally vertical axis passing centrally therethrough, and being adapted to contain fluid grinding material, and to receive fluid grinding material falling from said rotatable element;

drive motor means connected with said cup for effecting rotation thereof about said axis;

a comb-like member fixedly mounted to extend generally radially across the top of said rotatable cup, said member extending over at least a major portion of the radial distance from said peripheral wall to said axis, and carrying a plurality of spaced, downwardly projecting teeth arranged to effect mixing of fluid grinding material disposed

in said cup during rotation of said cup relative to said member;

shield means mounted to extend generally above and over said rotatable element, and including a discharge point disposed above said element and positioned to correctly



deposit fluid grinding material falling therefrom for the operation of said element; and

conveyor means of variable capacity mounted with one end thereof in said cup for collecting fluid grinding material therefrom, the other end of said conveyor means leading to said discharge point of said shield means.

4,031,672

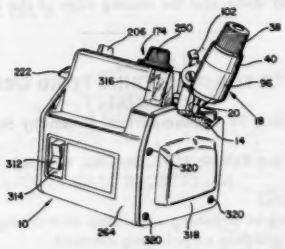
SHARPEN TWIST DRILLS OR THE LIKE

Robert Gordon Moores, Jr., Cockeysville, and Richard Eugene Walton, II, Baltimore, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Division of Ser. No. 456,946, April 1, 1974, Pat. No. 3,930,342. This application Sept. 12, 1975, Ser. No. 612,912

Int. Cl.² B24B *1/00*

U.S. Cl. 51—288 **5 Claims**



1. A method of grinding the leading end of twist drills or the like having a plurality of flutes, said method comprising the following steps:

A. rotating a grinding wheel about its axis;

B. advancing a twist drill or the like toward a surface of the grinding wheel to dispose the leading end of one of the flutes in a position suitable for grinding; and

C. spirally rotating the twist drill about an axis transverse to the longitudinal dimension of said twist drill and generally parallel to the grinding surface of the grinding wheel to cause the leading end of one of the flutes of the twist drill to move laterally across the grinding surface of the grinding wheel to be ground thereby whereby a more even wear distribution of the grinding wheel is obtained.

4,031,673

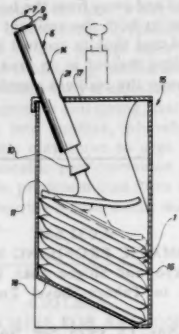
CLEANING DEVICE PREFERABLY FOR WATER CLOSETS

Anders Torvald Sverker Hagelberg, Molnlycke, Sweden, assignor to Bengt Petersson New Products Investment AB, Goteborg, Sweden

Filed Apr. 19, 1976, Ser. No. 678,208

Int. Cl.² B24D *15/04*; **A46B** *17/02*

U.S. Cl. 51—385 **9 Claims**



1. A cleaning device particularly for cleaning water closets, comprising: a holder stick device including a handle portion arranged at one end thereof and clamping means arranged at the opposite end thereof, said clamping means being actuated by manual operation of said handle portion between a clamping position for operably clamping therein a cleaning pad, and a release position for releasing said cleaning pad; a receptacle defining a space configured to store therein a plurality of cleaning pads stacked in a vertical pile one upon another; and a plurality of cleaning pads vertically stacked in a pile in said receptacle, said cleaning pads including a cleaning compound, being adapted for disposal thereof after use in a single cleaning operation, and being made of a material which effects disintegration of said pad in water; said receptacle including a supporting part for supporting said holder stick device in said receptacle by engagement with said handle portion and with said clamping means in a position to facilitate clamping therein of the top cleaning pad in said pile of pads stored in said receptacle to enable withdrawal of said holder stick device from said receptacle with a pad operatively engaged therein for use in a cleaning operation.

4,031,674

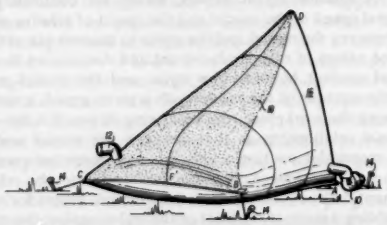
INFLATABLE TENT

J. Patrick Rand, 2357 Onyx St., Eugene, Oreg. 97403

Filed Jan. 19, 1976, Ser. No. 650,328

Int. Cl.² E04B *1/345*

U.S. Cl. 52—2 **2 Claims**



1. A camping tent comprising a flexible tent membrane and a separate tent support means, said tent membrane having the shape of a non-planar irregular tetrahedron when supported

by said support means, said tent being formed from a substantially rectangular sheet, first and second opposed edges of said sheet being joined along a first seam, a third edge of said sheet being joined with itself along a second seam substantially perpendicular to said first seam, and a fourth edge of said sheet being joined with itself along a third seam substantially perpendicular to both said first and second seams, at least one of said second and third seams comprising a zipper, said support means comprising a blower communicating with said tent membrane for blowing air into said tent membrane and a vent, said vent cooperating with said blower to replace air in said inflatable membrane and to regulate internal pressure.

4,031,675

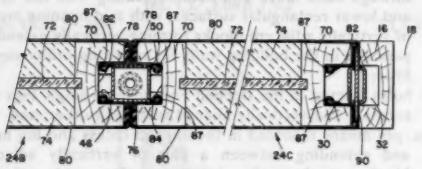
FREE STANDING REDECORATABLE VERTICAL WALL OR DIVIDER

Raymond P. Roberts, 5909 E. 58th Place, and Sven Arthur John Nilson, Jr., 5328 S. Toledo, both of Tulsa, Okla. 74135

Continuation-in-part of Ser. No. 581,740, May 29, 1975, abandoned. This application Feb. 26, 1976, Ser. No. 661,736

Int. Cl.² E04B *2/74*

U.S. Cl. 52—36 **28 Claims**



20. A free-standing vertical divider wall comprising:

a quadrilateral frame of desired thickness having upper and lower horizontal frame members attached to right and left vertical frame members;

first vertical supports each of thickness than the thickness of said frame retained within recesses along each of the inside vertical members of said frame and horizontally movable from said recess to a position inside said frame exposing a frontal width X;

said first supports include a plurality of vertically spaced apertures along their frontal width, keeper means, of length less than the thickness of said frame and insertable into said apertures between said panel and said right and left vertical frame members;

at least one second vertical support of thickness less than the thickness of said frame and of frontal width no greater than 2X, said second support vertically positioned to substantially divide the space horizontally between said first vertical supports, said second support being movable horizontally either side of said division line a distance equal to the width of said second support; and

a plurality of panels to substantially fill each horizontally divided space inside said frame, each of said panels having grooves hidden between front and back sides of said panel along each vertical edge, said grooves of thickness slightly larger than the thickness of said support members and of frontal width no less than the frontal width of said second supports.

4,031,676

WATER BLOCKING DEVICE

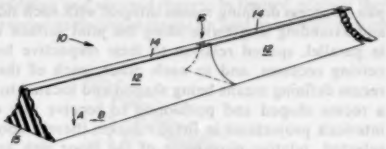
Don A. Dally, P.O. Box 181, Pillager, Minn. 56473

Filed Mar. 29, 1976, Ser. No. 671,361

Int. Cl.² E02D *27/00*

U.S. Cl. 52—102 **8 Claims**

1. A surface water blocking device comprising; a self-supporting longitudinally extending section member having, first means for connection to another such section member in interlocking fashion to present a continuous barrier to the flow of surface water, second means for removably fastening each member to the surface on which they rest in a water-tight semi-permanent fashion, the first means for connecting one



section member to another section member includes a tongue and groove joint, and the second means for removably fastening each section member to the surface includes suction cup type recesses provided in each section member.

4,031,677

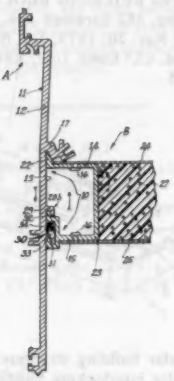
FLOOR SLAB TO SIDE WALL JOINT STRUCTURE FOR TRANSIT VEHICLE

Keith W. Tantlinger, Coronado, Calif., assignor to Rhor Industries, Inc., Chula Vista, Calif.

Filed Apr. 21, 1976, Ser. No. 678,732

Int. Cl.² E04C *1/10*; F16B *1/00*

U.S. Cl. 52—262 **4 Claims**



1. In a transit vehicle having a floor slab, two side walls, and a roof, floor-to-side wall joint joining each side wall substantially perpendicularly to a side of the floor slab, each joint structure comprising:

an extrusion comprising a lower structural element of each vehicle side wall and having a laterally inwardly exposed joint surface formed therealong,

a pair of vertically spaced, laterally outwardly extending flanges substantially integral with, and extending along each side of the floor slab, the laterally outward edge portions of each pair of said flanges being contact with their respective said side wall joint surface,

means integral with each of said side wall extrusions forming a vertically open, bead-receiving recess extending along each such joint surface,

a locking bead formed integrally with, and extending upwardly along the laterally outward edge portion of one of said side flanges of each pair thereof, each locking bead being shaped and located to fit into the locking bead recess of its respective side wall upon a selected movement of the floor slab relative to such side wall,

a first half of a plastic key interlock joint comprising a laterally outwardly open channel formed along, and comprising the laterally outward edge portion of the other of said side flanges of each pair thereof, an interlock projection extending along each side of each of said channels,

both of the projections of each pair thereof extending in the same direction as the locking bead on said one flange of their respecting pair thereof,

a second half of each plastic interlock joint comprising a pair of recess defining means integral with each side wall, and extending lengthwise along the joint surface thereof in parallel, spaced relation to their respective bead receiving recesses, and to each other, each of the latter recess defining means being shaped and located to define a recess shaped and positioned to receive one of said interlock projections in fitted relation therein upon such selected, relative movement of the floor slab and side wall, one of the latter recess defining means of each pair thereof being located within each of side channels, of a height to extend substantially to the bottom of its respective channel, and of a width for limited movement transversely therein, whereby such selected, relative movement of the floor slab and side wall opens up a key forming passage lengthwise within each joint for the reception of flowable, solidifiable, key forming compound for retaining said beads and said interlock projections in their respective recesses, thereby completing the joint structure.

4,031,678

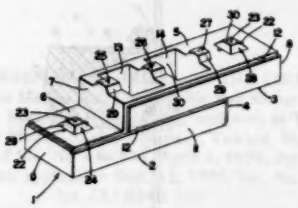
INTERLOCKING BUILDING BLOCK CONSTRUCTION

James A. Schuring, 352 Saratoga Ave., Canton, Ohio 44708

Filed Nov. 20, 1975, Ser. No. 633,574

Int. Cl.[2] E04B *1/02*; E04C *1/08*

U.S. Cl. 52—285 3 Claims



1. A rectangular building structure formed entirely of a plurality of similar interlocking building blocks, each block including:

a. a longitudinally extending, rectangular, upper surface terminating at one end in a lower stepped end surface;

b. a longitudinally extending, rectangular, lower surface terminating at one end in an upper stepped end surface;

c. said stepped end surfaces lying in a common horizontal plane and located at opposite ends of the building block;

d. a plurality of generally truncated pyramid-shaped recess means formed in the upper rectangular surface and a corresponding number of complementary generally truncated pyramid-shaped lug means formed on the lower rectangular surface, said lug means being aligned vertically with the recess means;

e. a single recess formed in the center of the lower stepped end surface and a single lug formed on the center of the upper stepped end surface, said lug and recess each having a truncated pyramid configuration complementary to each other;

f. the stepped end surfaces having a square planar configuration with the longitudinal lengths of the stepped end surfaces being equal to each other, and equal to the width of the upper and lower surfaces;

g. a first pair of spaced, parallel, vertically extending smooth end surfaces connecting the stepped end surfaces to their respective longitudinally extending rectangular surfaces;

h. a second pair of spaced, parallel, vertically extending smooth end faces connecting the upper surface with the upper stepped end surface and connecting the lower surface with the lower stepped end surfaces, respectively;

i. a pair of spaced, parallel, vertical, generally smooth side surfaces extending between the upper and lower rectangular surfaces, and between the pairs of spaced end surfaces;

j. the upper stepped end surfaces of the blocks being in abutting, overlapping relationship with lower stepped end surfaces of horizontally adjacent blocks with the single lugs of the upper stepped end surfaces being interlockingly engaged in the single recesses of the overlapped lower stepped end surfaces, with the lower rectangular surfaces being in abutting relationship with the upper rectangular surfaces of lower vertically adjacent blocks with the lug means of the lower surfaces being interlockingly engaged in the complementary recesses of the upper surfaces; and with the side surfaces of said horizontally and vertically adjacent blocks forming smooth continuous longitudinally extending wall surfaces, and with the side surfaces of adjacent blocks placed at right angles to each other forming smooth continuous right-angled corner surfaces;

k. opening means formed in and extending vertically through each block and communicating with the upper and lower rectangular surfaces, with said opening means of vertically adjacent blocks forming vertically extending passages in the building walls for receiving utility supply lines;

l. holes formed in the stepped end surfaces single lugs and recesses and vertically aligned with each other; and

m. pin means mounted in the aligned recess and lug holes and extending between a pair of vertically adjacent blocks mechanically interconnecting said adjacent blocks.

4,031,679

SPHERICAL STORAGE TANK FOR GASES AND LIQUIDS AND SUPPORTING BASE THEREFOR

Peter Feuerlein, Prattein, Switzerland, assignor to Buss Aktiengesellschaft, Basel, Switzerland

Filed Oct. 8, 1976, Ser. No. 730,862

Claims priority, application Switzerland, Nov. 5, 1975, 14466/75

Int. Cl.[2] E02D *27/32*

U.S. Cl. 52—294 5 Claims

1. In combination, a spherical tank for gases and liquids, a rigid load-bearing concrete foundation in the region of the vertical axis of said spherical tank, and a mounting interposed between said foundation and the underside of said spherical tank, said mounting having generally elastomeric properties and being solidly bonded to the underside of said spherical tank and to said foundation, said mounting consisting essentially of a plurality of rigid support elements in spaced array within a matrix of foamed heat insulation material, the upper and the lower surface of said plurality of said rigid support

elements being covered by elastic layers of a material remaining elastic even at very low temperatures, a load bearing steel shell interposed between said concrete foundation and the lower of said elastic layers, and a first adhesive bonding layer between the underside of said spherical tank and the top of the upper of said elastic layers, a second adhesive bonding layer between the bottom of the upper of said elastic layers and the top of said plurality of rigid support elements, a third adhesive bonding layer between the bottom of said plurality of rigid support elements and the top of the lower of said elastic layers, and a fourth adhesive bonding layer between the bottom of the lower of said elastic layers and the top of said steel shell, said mounting assuring orthotropic transmission of the load of said tank to the foundation and insulating the tank from the foundation to prevent heat losses.

4,031,680

STRUCTURAL ASSEMBLIES

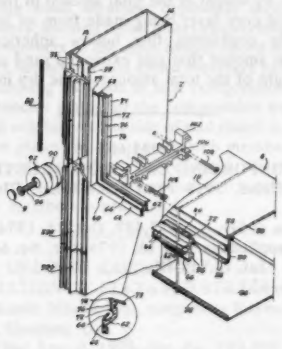
Richard Lewis Stoakes, "Clouds" Northdown Road, Woldingham, Surrey, England

Filed May 20, 1975, Ser. No. 579,214

Claims priority, application United Kingdom, May 29, 1974, 23832/74

Int. Cl.² E04B *1/62*

U.S. Cl. 52—400 **11 Claims**



1. A structural assembly comprising, in combination, as series of interconnected elongate members, a frame structure formed by said interconnected members, at least two contiguous cells or spaces being defined in said structure by said members, panes or panels mounted on or adjacent an outer face of said structure and providing infill members for said cells or spaces, sealing means engaging the infill members both at edges thereof and at portions of inner faces thereof adjacent said edges, said sealing means having a front face substantially coplanar with the outer faces of the infill members, and being contoured, at portions thereof engaging said edges of the infill members, to provide local resilient deformability, securing means engaging outer faces of the infill members adjacent said edges to apply a sealing pressure between the sealing means and said portions of the inner faces, said securing means comprising a series of devices that are disposed at intervals along the edges of the infill members, and means fixing said devices individually in position on the frame structure.

4,031,681

WALL CONSTRUCTION

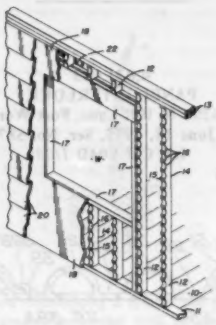
Joseph Charniga, P.O. Box 5037, Poland, Ohio 44514

Filed Feb. 4, 1976, Ser. No. 655,266

Int. Cl.² E04B *2/02*; E04C *2/80*

U.S. Cl. 52—408 **4 Claims**

1. An exterior load bearing wall construction comprising an inner wall portion, studding supporting said inner wall portion in continuous contact therewith, a plurality of closely spaced scallops formed in the outer surfaces of each of said studding so as to form narrow transverse areas therebetween, an outer wall portion positioned against said narrow transverse areas of said studding and secured thereto in limited contact therewith and exterior surfacing material on said outer wall portion, said



inner wall portion comprising dry wall or the like and said outer wall portion comprising insulating board and siding or the like, upper and lower plates positioned on the upper and lower ends of said studding, the outer surfaces of said plates being smooth, said insulating board of said outer wall portion being positioned against said smooth surfaces of said plates in substantially weather-tight relation.

4,031,682

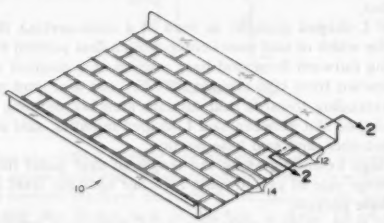
PREFABRICATED BUILDING PANEL AND METHOD OF MAKING

J. Steven Renkert, Canton, Ohio, assignor to Metropolitan Industries, Canton, Ohio

Division of Ser. No. 569,276, April 14, 1975, Pat. No. 3,965,635. This application June 22, 1976, Ser. No. 698,309

Int. Cl.² E04B *2/00, 1/00*

U.S. Cl. 52—434 **8 Claims**



1. A wall panel including a plurality of ceramic, masonary or the like facing bricks spaced apart but bonded together by a first cementitious mixture deposited and hardened in the spaces separating the bricks, the cementitious mixture covering a rear portion of some of the bricks but none of the front portion,

a lattice work of beams and shafts joined to both the back portions of at least some of the bricks by the bond of said cementitious mixture and to each other by welding,

at least some of the beams and shafts being of a cross-sectional shape other than round, thereby providing a more rigid composite panel,

a layer of a second cementitious mixture at least partially covering the exposed surface of the lattice work, bricks and the first cementitious mixture, said layer helping to join the lattice work to the facing bricks,

said second cementitious mixture including hydrated cement and glass fibers,

said layer having a thickness not substantially greater than ¼ inch.

4,031,683

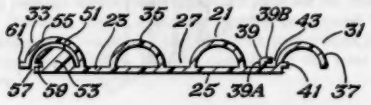
PANEL INTERLOCK

Ray R. Walker, 6209 N. Hill Lane, Fort Worth, Tex. 76135

Filed June 18, 1975, Ser. No. 587,997

Int. Cl.² E04D *1/08*

U.S. Cl. 52—536 5 Claims



1. A panel for use for construction purposes and having opposite edges to be interlocked with adjacent panels, comprising:

a base portion having an inner side and an outer side,

one of said edges having an arcuate interlock member extending along the length of said one edge,

said arcuate member as seen in a cross-section through the width of said panel extends outward beyond said base portion and away from said other edge and has a free edge spaced from said base portion,

the other edge of said panel having an arcuate slot extending along the length of said other edge,

said arcuate slot as seen in a cross-section through the width of said panel has an opening along said other edge,

said arcuate slot extends from said opening outward beyond said base portion and toward said one edge,

a L-shaped member extending along the length of said panel from the outer edge of said base portion and located at a position near but spaced inward from said arcuate member,

said L-shaped member as seen in a cross-section through the width of said panel comprising a first portion extending outward from said base portion at a position spaced inward from said arcuate member and a second portion extending towards said arcuate member defining an L-shaped slot between said L-shaped member, said arcuate member, and said base portion,

a ridge extending along the length of said panel from the inner side of said arcuate member near the level of said base portion,

said ridge being generally parallel with base portion and extending in a direction away from said other edge of said panel,

said arcuate slot being defined by:

structure extending outward from said base portion and having an arcuate outward facing surface, and

a second arcuate member spaced outward from said structure and following said arcuate outward facing surface of said structure,

said second arcuate member extending from said panel away from said one edge and having a free end defining said opening between said free end and said structure,

said structure defining said arcuate slot having a slot formed therein along its length near said opening and extending generally parallel with said base portion,

said second arcuate member having a ridge formed at its free end along its length and extending generally parallel with said base portion in a direction away from said one edge.

4,031,684

DECORATIVE PRECAST CONCRETE BOARDS AND PROCESS FOR PRODUCING THE SAME

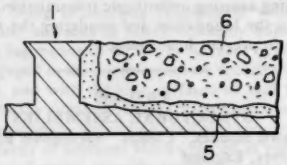
Tokuhito Shibata, 1 Nishi Koike-cho, Toyohashi, Aichi, Japan

Continuation-in-part of Ser. No. 482,303, June 24, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,865

Claims priority, application Japan, Mar. 15, 1974, 49-029213

Int. Cl.² E04B *5/04*

U.S. Cl. 52—612 6 Claims



1. A decorative precast concrete board comprising at least one surface layer and a core layer, the four edges of which recede or are indented toward the back side, said surface layer being made of an inorganic cement mortar containing non-expanded shirasu at least in an amount that said sand occupies at least 30% by weight of the total amount of the dry ingredients, and said core layer being made from an inorganic concrete mortar containing fine hollow spherical expanded shirasu in an amount that said expanded sand occupies 10 – 70% by weight of the total amount of the dry ingredients.

4,031,685

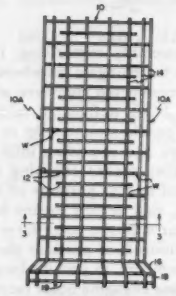
REINFORCING CAGE CONSTRUCTION

Robert F. Heinz, 3910 Pratt Lake Road, Gladwin, Mich. 48624

Continuation of Ser. No. 517,489, Oct. 24, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 657,992

Int. Cl.² E04H *12/12*; E04C *5/03*

U.S. Cl. 52—653 11 Claims



1. A prefabricated cage section for constructing a tubular wire mesh reinforcing cage for concrete pipe or like structures; said section comprising a plurality of arcuate wire members and a plurality of axially extending wire members fixedly secured to said arcuate members at one of the concave and convex sides thereof to define an arcuate grid structure conformed to constitute a full length quadrant segment of less than 120° arcuate extent of a tubular wire reinforcing cage, and stacking elements fixedly mounted at spaced locations on one of the concave and convex sides of said grid structure and projecting radially from said one of said sides by a distance such that a curved surface containing those points of said arcuate grid lying at a minimum radial distance from the axis of arcuateness at the concave side of said grid is congruent with a curved surface containing those points of said arcuate

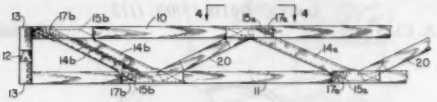
grid lying at a maximum radial distance from said axis at the convex side thereof whereby like sections can be stacked in concave to convex side nested relationship with each section the next adjacent section at at least three peripherally spaced support locations.

4,031,686

COMBINATION WOOD AND METAL TRUSS STRUCTURE

Arthur Carol Sanford, 2308 Bay Drive, Pompano Beach, Fla. 33062

Filed Jan. 13, 1977, Ser. No. 759,072
Int. Cl.² E04C *3/17, 3/292*
U.S. Cl. 52—693 **8 Claims**



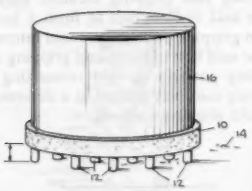
1. A combination wood and metal truss structure comprising wood chord members and a series of diagonal compression and tension web members therebetween, said compression members being wood members oppositely inclined to said tension members, toothed metal plates connecting the ends of all said web members to the sides of said chord members, the opposed inner surfaces of said chord members having notches abuttingly receiving the ends of said compression web members, the connector plates for the compression web members overlying said notches on one side of said chord members, and the connector plates for the tension web members overlying said notches on the other side of said chord members, whereby movement of the compression web members laterally of said chord members is prevented.

4,031,687

FORMATION OF ELEVATED STRUCTURES

Howard W. Kuntz, Miami, Fla., assignor to Raymond International Inc., Houston, Tex.

Filed Aug. 2, 1976, Ser. No. 710,470
Int. Cl.² E04B *1/00;* **E02D** *27/00*
U.S. Cl. 52—742 **16 Claims**



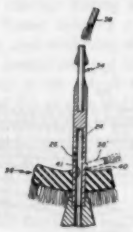
1. A method of constructing an elevated platform, said method comprising the steps of providing a blanket of sand on the earth, installing a plurality of spaced apart support elements to extend from a bearing region in the earth beneath the sand blanket and up to a location near the top of said sand blanket, embedding water jet nozzles in said sand blanket with water conduits extending from outside said sand blanket to said nozzles, forming a mold surrounding said plurality of support elements at their upper end, with the upper surface of said sand blanket forming the bottom of said mold, pouring concrete into said mold and allowing it to solidify in contact with the upper ends of said support elements and to form a platform supported by the support elements, and thereafter washing out the sand from between said support elements under the platform by pumping water through said conduits and causing jets of water to be directed from said nozzles.

4,031,688

TECHNIQUE FOR PRESSURIZING A SEALED ARTICLE

George J. Wasserman, 110 Babcock St., Brookline, Mass. 02146

Filed Sept. 4, 1975, Ser. No. 610,128
Int. Cl.² B65B *31/08*
U.S. Cl. 53—7 **23 Claims**



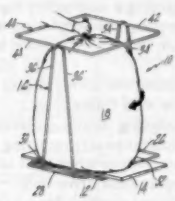
22. In a method of inflating a tennis ball the step of coring a cylindrical segment from the wall of said ball with said segment having a diameter in the order of one millimeter, removing the core from the wall, introducing air into said ball through the hole formed in the wall and thereafter sealing the hole formed by the removal of said core.

4,031,689

FLEXIBLE BAG SUPPORTING DEVICE

Philip E. Sullivan, c/o Columbia Poly Pak Company, 83 Meadow St., Hartford, Conn. 06114

Filed Sept. 18, 1975, Ser. No. 614,515
Int. Cl.² B65B *7/12, 51/00, 67/12*
U.S. Cl. 53—370 **2 Claims**

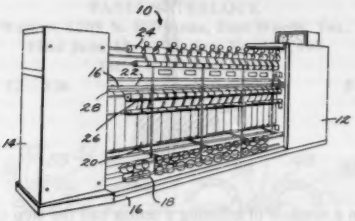


1. For use with a flexible bag having a bottom closed end and an upper open end, a bag supporting device comprising a base, a support platform mounted for rotation on the base for supporting the closed end of the bag, a stand of an open wirelike frame construction having a bag mounting rim, a bottom member and upright legs connecting opposite sides of the bottom member to the bag mounting rim of the stand to locate the bag mounting rim in elevated relation to the platform at a height less than the height of the bag to be supported such that the upper end of the bag may be reversely folded over the rim with the bag open and extended for loading, and mounting means for securing the bottom member of the stand in fixed relation to the support platform, the support platform and the stand being rotatable in unison relative to the base such that upon spinning the bag and stand on the support platform while holding the upper end of the bag fixed, its upper end may be formed into a tightly twisted closure and handle for efficient removal and lifting of the bag, the platform having a face scored with a plurality of slots conforming to the configuration of the open wirelike bottom member of the stand for receiving the same in a stabilized assembly, the mounting means removably securing the bottom member of the stand in the slots of the support platform.

4,031,690
NOISE SUPPRESSION APPARATUS AND METHOD FOR FALSE-TWIST TEXTURING MACHINES

Lorimer Phillip Thomas, and Robert Harold Walker, both of Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Oct. 2, 1975, Ser. No. 618,969
Int. Cl.² D02G *1/02*; G10K *11/00*
U.S. Cl. 57—1 R **11 Claims**



1. Noise abatement apparatus for a yarn texturing machine of the type having a frame extending between a gear housing and a motor housing, a plurality of rotatable devices spaced longitudinally along said frame, a plurality of pulley means mounted on said frame and spaced longitudinally therealong, an endless drive belt extending from within said motor housing along said frame and into said gear housing and in driving engagement with a portion of each said pulley means, a plurality of idler pulleys, means for mounting said idler pulleys along said frame in engagement with said endless drive belt, an endless driven belt extending along said pulley means and in engagement with another portion of each said pulley means and in driving engagement with each of said rotatable devices, said texturing machine further including yarn transport means and heater means mounted on said frame, said noise abatement apparatus comprising:

a. means for enclosing a said pulley means located adjacent to said gear housing, said enclosing means including pairs of openings for said endless drive belt and said endless driven belt,

b. means for isolating vibrations of said idler pulleys' mounting means from said frame,

c. means for reducing sound generation from said idler pulleys and simultaneously reducing the rotational velocity of said idler pulleys when said idler pulleys are being rotated by said endless drive belt.

9. A noise abatement method for a yarn texturing machine of the type having a motor housing at one end of the machine, a gear housing at the other end thereof, a frame extending between said housings, a plurality of rotatable spindles spaced along said frame, a plurality of pulleys mounted on said frame and spaced longitudinally therealong, an endless drive belt extending from said motor housing, along said frame and into said gear housing with said drive belt being in driving engagement with a portion of each said pulley means, a plurality of idler pulleys, means for mounting said idler pulleys along said frame in engagement with said endless drive belt, an endless driven belt extending along said pulley means and in engagement with another portion of each said pulley means so as to be driven thereby, said endless driven belt being in driving engagement with said rotatable spindles, said yarn texturing machine further including yarn transport means and heater means mounted on said frame, said method comprising the steps of:

a. enclosing the pulley located adjacent to said gear housing with enclosure walls lined with sound absorbing material,

b. providing, with said enclosure walls, tunnels for said endless drive belt and lining said tunnels with sound absorbing material,

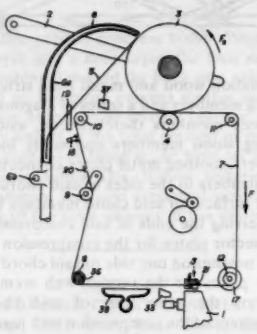
c. providing cushioning means for said mounting means for said idler pulleys, and

d. providing sound reducing means on the rotatable portion of each idler pulley.

4,031,691
DEVICE FOR REINSERTING THE BROKEN YARN IN AN OPEN END SPINNING UNIT

Christian Roehrich, Chaillevette, France, assignor to Nuova San Giorgio S.p.A., Genoa-Sestri, Italy

Filed Aug. 13, 1976, Ser. No. 714,114
Claims priority, application Switzerland, Aug. 20, 1975, 10807/75; Nov. 28, 1975, 15462/75
Int. Cl.² D01H *15/00*, *1/12*
U.S. Cl. 57—34 R **17 Claims**



1. A device for reinserting the broken yarn in a spinning unit of an open end type of spinning frame, comprising a disengaging or releasing member between the winding up bobbin and associated driving shaft, means for extracting the broken end of yarn from the bobbin yarn, a yarn gripping element, a device for reinserting the yarn in the spinning unit, means for transferring said gripping element from a yarn gripping position to said reinserting device and a thread cutter adjacent said reinserting device, said transfer means comprising an endless belt having said gripping element secured thereto, guide means for said endless belt to form a loop passing in front of said yarn gripping position and said reinserting device, driving means for said belt to move said gripping element from said yarn gripping position to said reinserting device, and means for stopping said belt at least at a determined position of the path of said gripping element.

4,031,692
NOVEL HOSIERY YARN

F. Holmes Simons, and Michael P. Taylor, both of Charlotte, N.C., assignors to Fiber Industries, Inc., Charlotte, N.C.

Continuation of Ser. No. 275,390, July 26, 1972, abandoned, and a continuation-in-part of Ser. No. 166,580, July 27, 1971, abandoned. This application Jan. 7, 1976, Ser. No. 647,235
Int. Cl.² D02G *3/24*, *3/26*, *1/02*
U.S. Cl. 57—140 R **11 Claims**

1. Pick resistant hosiery comprising twist lively yarn comprising at least 50% polyester, said polyester being essentially 100% poly(tetramethylene terephthalate), said yarn having an available torque ratio of 1 to 3, a sum of initial twist and developed twist less than 55 t.p.i., a percent developed crimp of at least about 12 percent, and from 1 to 50 filaments.

4,031,693
ELECTRONIC DIGITAL CLOCKS

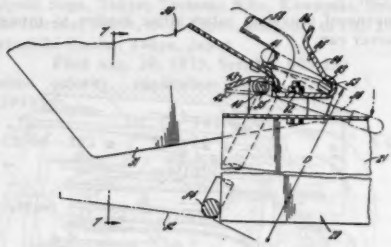
Albrecht Haag, Dauchingen, and Helmut Stechmann, Schwenningen, both of Germany, assignors to Kienzle Uhrenfabriken GmbH, Schwenningen, Germany

Filed Dec. 23, 1975, Ser. No. 643,878

Claims priority, application Germany, Dec. 27, 1974, 2461563; Feb. 25, 1975, 2508037

Int. Cl.² G04C *13/06*

U.S. Cl. 58—33 **32 Claims**



1. An electronic digital clock having at least one time-programmed electrical output for triggering switching functions, the clock comprising a digital electrical time display, a clock circuit for producing and applying to said display coded signals representing time, a multiplexer, at least one coded fixed-value store, a sampling logic circuit and a comparator circuit, wherein coded values stored in the fixed-value store are sampled under the control of the multiplexer by the sampling logic circuit and are compared in the comparator circuit with said coded signals representing time, and wherein the event of coincidence between the sampled values and the coded signals representing time an output signal is produced at said time-programmed electrical output.

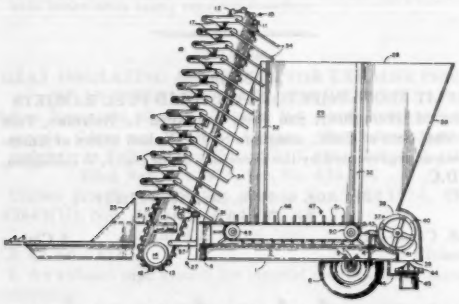
4,031,694
MOWER ASSEMBLY WITH CATCHER SECUREMENT

Donald L. Gobin, Savannah, Ga., assignor to Roper Corporation, Kankakee, Ill.

Filed May 17, 1976, Ser. No. 686,888

Int. Cl.² A01D *35/22*

U.S. Cl. 56—202 **11 Claims**



1. A mower assembly with catcher securement comprising, in combination, a rotary mower structure including a housing having a discharge chute of inverted U cross section formed of side walls and a top wall and defining an opening for outward discharge of a stream of clippings, a guard of inverted U cross section having sides and a top wall superimposed on the discharge chute and extending beyond it, means for pivoting the guard to the discharge chute along an axis located at the top wall of the chute adjacent the discharge opening, means for biasing the guard downwardly about its pivot axis, a stop in the path of downward movement of the guard for defining a normal downwardly-angled guarding position for interception of missiles in the stream, the sides of the guard including projections extending inwardly of the pivot axis and having upwardly facing notches at the inner ends thereof defining vertical obstructing edges, means on the top wall of the chute defining a horizontally facing groove spaced inwardly of the pivot axis and parallel thereto and so located as to be in register with the notches when the guard is tilted to a horizontal freely discharging position, a catcher having a frame and a bag supported thereby, the frame defining a throat registering with the end of the chute and enclosing the guard, the frame including a horizontal supporting rod at the upper edge of the throat, an upstanding guide member mounted on the discharge chute adjacent the groove and so angled that when the horizontal supporting rod of the catcher is positioned against the guide member and pressed downwardly against the projections on the guard, the guard is swung upwardly to a position slightly beyond the horizontal position for entry of the supporting rod into the groove followed by slight downward movement of the guard under the force of bias into horizontal position in which the obstructing edges of the notches hold the rod captive in the groove.

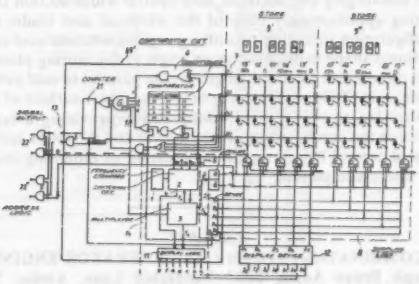
4,031,695
TREE HEDGING ARRANGEMENT

Richard E. Diggs, P.O. Box 776 South 12A Road, Carthage, Mo. 64836

Filed Oct. 28, 1975, Ser. No. 626,449

Int. Cl.² A01D *55/24*

U.S. Cl. 56—237 **14 Claims**



1. A hedging apparatus comprising:

a. a wheeled vehicle which rolls over the ground;

b. a powered chain saw on said vehicle, said saw having a chain bar with a rotatively movable cutter chain thereon and being oriented to sever the branches of trees which the vehicle rolls past during a hedging operation; said cutter chain moving about said chain bar in a cutting direction;

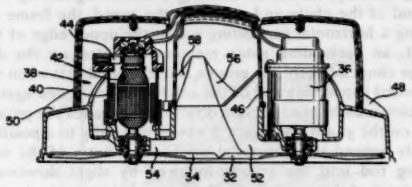
a plurality of guide bars attached to the chain bar and extending forwardly therefrom beyond the cutter chain; the guide bars being spaced apart from each other along the length of the chain bar; and

d. said guide bars each having a first surface thereof engaging selected branches and restraining the same from motion relative to said cutter chain in the cutting direction; said first surface being blunt from a forwardmost point thereof to a point disposed adjacent to said cutter chain for non-cutting abutment with said selected branches, whereby the selected branches are severed by a chopping, non-sharing motion of said cutting chain.

4,031,696
BLADE CONFIGURATION FOR CORDLESS LAWNMOWER

Donald Earl Fleigle, Frostburg, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed Aug. 8, 1975, Ser. No. 603,251
Int. Cl.² A01D 55/18
U.S. Cl. 56—295 1 Claim



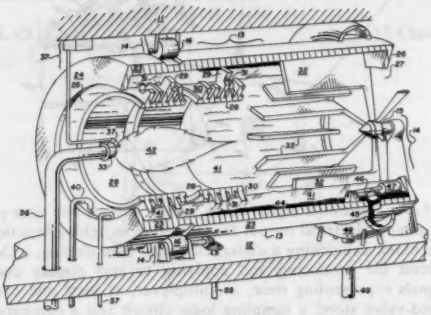
1. In a cordless electric lawnmower of the type comprising a housing, a battery supported on said housing, a handle mounted on said housing, a switch supported on said handle, an electric motor mounted on said housing and connected to be energized from said battery via said switch, a blade adapted to be rotated in a horizontal plane within said housing by said motor, and a helical discharge path defined by said housing for receiving air and grass clippings propelled by said blade without causing substantial recutting of said clippings, the improvement comprising an improved configuration for said blade to provide maximum cutting and air propelling efficiency so that said grass clippings tend to remain entrained from the time of severing the clipping to the point of discharge from the mower housing, said configuration comprising an air foil cross section along the full length of said blade, said cross section comprising a generally flat central width section and two converging end sections, said central width section comprising approximately 60% of the width of said blade; said configuration including two lifting regions wherein said cross sectional shape is disposed at an angle to the cutting plane of said mower and a central length region parallel to said cutting plane, said lifting regions lying below the upper surface of said central length region, said configuration providing a recess between the cutting plane of said mower and the lower surface of said central length region for location of mounting means for said blade therein.

4,031,697
COMBINATION STEAM-GAS GENERATOR ENGINE

Joseph Bryan Adair, 2103 Vanderbilt Lane, Austin, Tex. 78723

Filed Apr. 18, 1976, Ser. No. 675,071
Int. Cl.² F02C 7/00
U.S. Cl. 60—39.55 17 Claims

1. A combination steam-gas generator engine comprising
A. a ground base support structure;
B. an engine bed frame supported by a conventional means at a spaced-apart distance from the ground base support structure with means for rotatably supporting a rotary can burner;
C. an input air compressor;
D. a compressed air transmission duct routed between the compressed air supply end of said input compressor and the input end of a rotary can burner;
E. a generally horizontally positioned rotatably mounted hollow tubular can burner structure having
1. a cylindrical wall,
2. an appropriate fuel injection nozzle with associated means of igniting fuel injected into the burner can,
3. a cylindrical wall of vaporizable liquid fluid forming a liquid liner on the interior wall of the burner can and held against said interior wall of the burner can by centrifugal force resulting from high speed rotation of the burner can,
4. at least one rotatable flame protecting flame gallery liner of a thermally conductive material concentrically mounted to and within the burner can near the fluid input end of the can and supported at a spaced-apart distance from the burner can wall, with the space between the outer portions of the flame gallery liner and the burner can wall being partially occupied by said cylindrical wall of vaporizable liquid fluid,
5. a fluid input means at one end of the burner can, and
6. a fluid output means at the opposite end of the burner can;
F. means of providing rotary drive motion to rotate the burner can;

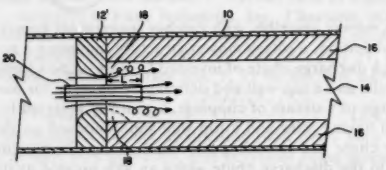


G. an auxiliary power turbine gas inlet duct coupled to the downstream output end of the rotatable burner can;
H. a driven auxiliary power turbine wheel rotatably mounted in such position as to be driven by the gasseous fluid flowing from the rotatable burner can through the auxiliary power turbine gas inlet duct;
I. means of coupling rotative energy developed by the auxiliary power turbine wheel to auxiliary and accessory equipment;
J. a generated gas directive duct; coupled to
K. a useful load device;
L. means for controlling the supply and flow of vaporizable liquid fluid into the burner can;
M. means for controlling the supply and flow of fuel to the fuel injection nozzle in the burner can.

4,031,698
SPLIT FLOW INJECTOR FOR SOLID FUEL RAMJETS

John M. Humphrey, San Jose, and Allen L. Holzman, Palo Alto, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 6, 1976, Ser. No. 712,421
Int. Cl.² F02K 9/04
U.S. Cl. 60—251 5 Claims



1. In a solid fuel ramjet, having a casing with an injector port and a fuel port with a recirculation region adjacent to and

downstream from said injector port, the improvement comprising:

an inner tube situated centrally in said injector port and extending into said fuel port to divide an airflow through said injector port into a primary and secondary airstream, said primary airstream being injected into said recirculation region to stabilize combustion and said secondary airstream being injected into said fuel port downstream from said recirculation region to smooth said airflow.

4,031,699

PORT LINER ASSEMBLY

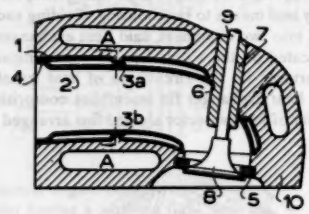
Yoshiyuki Suga, Tokyo; Tsutomu Kita, Kawasaki, and Ryusuke Harada, Tokyo, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 20, 1975, Ser. No. 606,238

Claims priority, application Japan, Oct. 25, 1974, 49-129185

Int. Cl.² F01N 3/10

U.S. Cl. 60—282 **6 Claims**



1. A port liner assembly for internal combustion engines having at least one exhaust valve seat, comprising,

a cylinder head block,

an exhaust port having an inner wall provided in said cylinder head block communicating with at least one exhaust valve seat,

a tubular liner provided in said exhaust port comprising an outer tube and an inner tube engaged with each other forming a hollow structure,

said tubular liner having means for sliding an outer end of said inner tube relative to said outer tube, said inner tube constituting a floating tube,

said inner and outer tubes having inner ends adjacent the exhaust valve seat, and

said inner ends being secured together.

4,031,700

HEAT INSULATING APPARATUS FOR EXHAUST PIPE OF AN INTERNAL COMBUSTION ENGINE

Nobuo Yamazaki, Gunma; Takeshi Ito, Ohta; Tetsuro Katsurada, Ohta, and Yasuhiko Habara, Ohta, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1975, Ser. No. 634,786

Claims priority, application Japan, Nov. 26, 1974, 49-143649[U]; Nov. 26, 1974, 49-143651[U]

Int. Cl.² F01N 7/00

U.S. Cl. 60—322 **7 Claims**

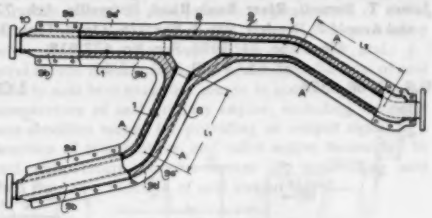
1. An exhaust pipe system for internal combustion engines comprising

an exhaust pipe comprising first straight portions and bending portions and second straight portions positioned after the bending portions which are alternately arranged and continuously connected with each other,

a heat insulating layer disposed on said exhaust pipe,

a cover covering said heat insulating layer,

said heat insulating layer on the second straight portions positioned after each said bending portion having an eccentric cross-section of thickness having a stretching side and a diametrically opposite side, in which the thickness of the stretching side thereof is greater than that of the diametrically opposite side and being adapted to absorb a thermal expansion of a preceding said first straight portions, said cover on said second straight portions after each said bending portion being eccentrically



offset relative a longitudinal axis of said second straight portions, and

one end of said cover being secured to said exhaust pipe and the other end of said cover slidably engaging with said exhaust pipe.

4,031,701

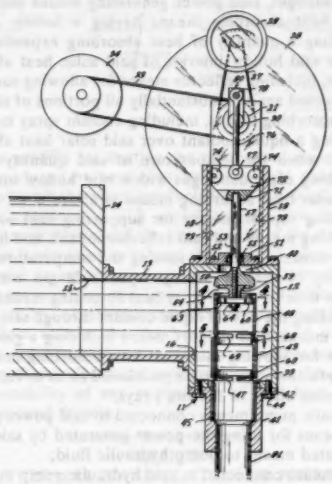
WATER MOTOR

Carl H. Upton, 12831 Clark Ave., Downey, Calif. 90242

Filed Mar. 30, 1976, Ser. No. 671,840

Int. Cl.² F15B 1/06

U.S. Cl. 60—325 **10 Claims**



1. A water motor unit comprising:

a cylinder having a port on the sidewall thereof,

an outlet conduit extending from the lower end of said cylinder,

a piston means including a piston rod, said piston means reciprocatingly movable in said cylinder and having a port on the sidewall thereof, and

a container providing a supply of water immersing said cylinder and said piston means,

whereby when said piston means is in its uppermost position relative to said cylinder the ports of said cylinder and said piston means are open to enable water to flow from the container into the cylinder to fill the outlet conduit with a continuous column of flowing water, and

whereby when said piston means moves downwardly into said cylinder the ports in each are closed resulting in the column of water in the outlet conduit exerting a downward pulling action on the piston means until the ports of each mate and provide an opening thereby permitting

water to flow from the container into the cylinder and terminate the pulling action on the piston means.

4,031,702

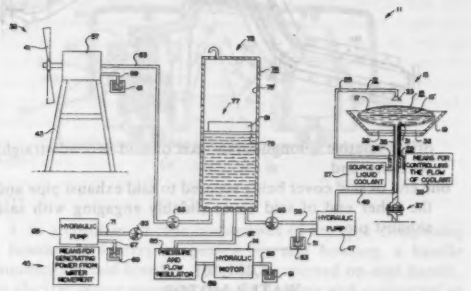
MEANS FOR ACTIVATING HYDRAULIC MOTORS

James T. Burnett, River Bank Road, Batesville, Ark. 72501, and Arnold P. Hendrix, Rte. 1, Box 775, Atoka, Tenn. 38004

Filed Apr. 14, 1976, Ser. No. 677,018

Int. Cl.² F15B *1/02, 18/00*

U.S. Cl. 60—398 **2 Claims**



1. Means for activating hydraulic motors, said means comprising:

a. at least one power generating means for generating power from sunlight, said power generating means including a solar heat absorbing means having a hollow interior, including a quantity of heat absorbing expandable gas within said hollow interior of said solar heat absorbing means, including reflector means for allowing sunlight to be directed against substantially all portions of said solar heat absorbing means, including coolant spray means for spraying a liquid coolant over said solar heat absorbing means when the temperature of said quantity of heat absorbing expandable gas within said hollow interior of said solar heat absorbing means is above a set amount, including support means for supporting said solar heat absorbing means and said reflector means, and including a thermostat device for sensing the temperature of said quantity of heat absorbing expandable gas within said hollow interior of said solar heat absorbing means and for controlling the flow of liquid coolant through said coolant spray means, said support means including a gimbal-like device for allowing said solar heat absorbing means and said reflector means to be positioned so as to receive the maximum effect of the sun's rays;

b. hydraulic pump means connected to said power generating means for using the power generated by said power generated means to pump hydraulic fluid;

c. tank means connected to said hydraulic pump means for receiving and storing the hydraulic fluid pumped by said hydraulic pump means, said tank means including means for maintaining the hydraulic fluid under a constant pressure; and

d. means for allowing the hydraulic fluid stored within said tank means to selectively pass to a hydraulic motor whereby the hydraulic motor is activated.

4,031,703

SPHERICAL STIRLING ENGINE

Charles G. Redshaw, 15001 SE. 44th Place, Bellevue, Wash. 98006

Continuation-in-part of Ser. No. 602,923, Aug. 7, 1975, Pat. No. 3,984,981. This application June 18, 1976, Ser. No. 697,624

Int. Cl.² F02G *1/04*

U.S. Cl. 60—519 **10 Claims**

1. A spherical Stirling cycle engine having means for internal heat transfer comprising:

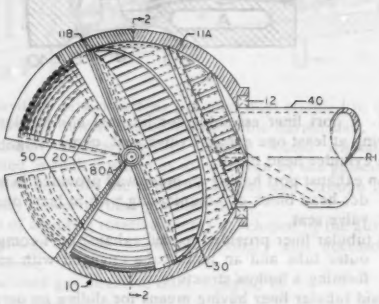
a housing fixed against rotation comprising;

two substantially hemispherical members having means for joining and sealing around their common diametrical plane forming an essentially spherical cavity, said members each having a circular aperture located diametrically opposite each other;

a circular disk located within said cavity and engaged with said housing by sealing means to divide said cavity into two substantially equal first and second sections, said disk having a first axis with a journal segment extending diametrically across the disk in said first section, and a second axis positioned perpendicular to said first axis with a journal segment extending diametrically across the disk in said second section;

substantially similar first and second spherical-sector shaped heat exchangers located in said first and second sections respectively, and pivotally mounted about said first and second axis to form a universal coupling between them, with the wedge apex engaged by seal means to said journal segments and the wedge lune juxtapose and engaged by seal means to said housing, dividing each of said sections into two chambers, said heat exchangers having ports located on the wedge lune in communication with said apertures for the circulation of heat transfer fluids through heat exchanger fin assemblies comprising;

a plurality of hollow sector shaped fins arranged symmetrically to form a spherical-sector shape with openings on common manifolds connected to said ports;



atachment means to prevent movement of said first heat exchanger, located in said first section, relative to said housing;

connective means for drivingly engaging said second heat exchanger for nutative movement, said movement providing an oscillating motion to said second heat exchanger about said second axis varying the effective volume of said chambers in said second section, and an oscillating motion to said disk about said first axis varying the effective volume of said chambers in said first section;

substantially similar spherical-sector shaped heat regenerators located within each said chamber by attachment means to said disk, and connected by passages through said disk between said first and second sections to form two interconnected pair of chambers, said regenerators comprising;

a plurality of sector shaped fins arranged for interspacing with said heat exchanger fin assemblies, and mounted on a common manifold to form a spherical-sector shape, said fins providing fluid passage in heat exchange relationship with a working fluid circulated between said interconnected chambers through said manifolds and passages;

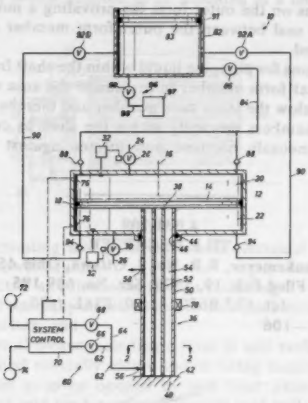
means for supplying heat to said first heat exchanger;

means for removing heat from said second heat exchanger.

4,031,704
THERMAL ENGINE SYSTEM

Marvin L. Moore, 16204 Diana Lane, Apt. 323A, Houston, Tex. 77062, and William M. Moore, 8820 Mountain Path Circle, Austin, Tex. 78750

Filed Aug. 16, 1976, Ser. No. 714,300
Int. Cl.² F03G 7/06
U.S. Cl. 60—325 **10 Claims**

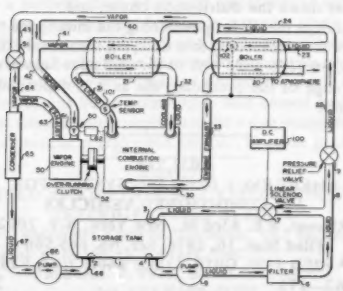


1. A thermal engine comprising:
a cylinder having a working fluid therein;
a piston reciprocally movable in first and a second direction within said cylinder and dividing said cylinder into a first and second region;
an expansible member operatively associated with said piston and responsive to the temperature of a driving fluid to move said piston reciprocally within said cylinder to alternatively pressurize working fluid in said first and second regions; and,
means for introducing driving fluid of a predetermined temperature into a heat exchange relationship with said expansible member.

4,031,705
AUXILIARY POWER SYSTEM AND APPARATUS

John W. Berg, 1111 Morse Ave., Space No. 35, Sunnyvale, Calif. 94086

Continuation-in-part of Ser. No. 524,262, Nov. 15, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,415
Int. Cl.² F01K 23/10
U.S. Cl. 60—615 **37 Claims**

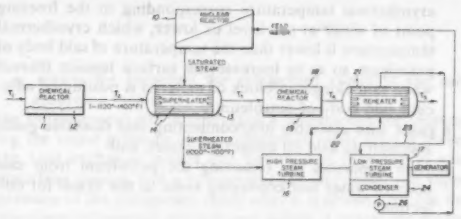


1. Apparatus for providing mechanical power from normally wasted heat energy, comprising:
primary engine means for generating primary power and heat not used for said primary power.
fluid having a boiling point well below that of water,
heat exchange means connected to said engine for heating said fluid from a liquid state to a vapor by employing heat normally wasted by said primary engine means,
auxiliary vapor-operated engine means for generating power from the energy supplied by said vapor, and
control means for automatically controlling the flow of said fluid to said heat exchange means in accordance with the temperature of said primary engine, including temperature-sensitive means for providing an output signal as a function of temperature, and valve means connected to said temperature-sensitive means for controlling said fluid flow as a function of said output signal.

4,031,706
SUPERHEATING STEAM FROM LIGHT WATER NUCLEAR REACTORS

Himanshu B. Vakil, Schenectady, and Dale H. Brown, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 18, 1975, Ser. No. 641,835
Int. Cl.² F01K 21/00
U.S. Cl. 60—644 **10 Claims**



1. In a process for heating the pressurized steam product stream produced by heat generated in a light water nuclear reactor wherein the steam product stream is brought into heat exchange relationship with a high temperature source in a heat exchange device and the temperature of the steam product stream is increased to at least about 650° F. after which the superheated steam so produced is used to operate a steam turbine-generator set, the improvement comprising using a combustion-less exothermic chemical reaction for the generation of heat utilized for the heating step, said exothermic chemical reaction having a maximum attainable temperature limited by thermodynamic considerations to a value below the design capability of any component of said heat exchange device exposed thereto.

4,031,707
CRYOTHERMAL MANIPULATION OF PETROLEUM SPILLS ON WATER

Sigmund Lance Ross, deceased, late of 1 Cornell St., Scarsdale, N.Y., by Rose Shuffman, executive, Scarsdale, N.Y., and Oscar Shuffman, 2761 Sedgwick Ave., New York, N.Y., assignors to Rose Shuffman, Executrix, Scarsdale, N.Y.

Filed Apr. 24, 1972, Ser. No. 246,960
Int. Cl.² E02B 3/00
U.S. Cl. 61—1 F **8 Claims**

1. A method for recovering a body of petroleum constituting an oil spill on a large body of water comprising the steps of:
providing a plurality of elongated booms each comprising material at a cryothermal temperature corresponding to the freezing point of water at sea level or lower, which cryothermal temperature is lower than the temperature of said body of petroleum, each of said elongated booms being disposed in adjacent end-to-end pivotally connected relationship;
floating said elongated booms in the body of water with said material facing and adjacent the periphery of said body of

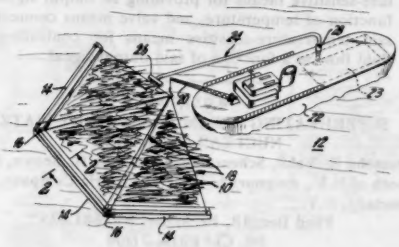
petroleum so as to increase the surface tension of said body of petroleum that is adjacent thereto and cause it to move away therefrom into a more restricted area; and

removing said body of petroleum from the water.

4. Apparatus for recovering a body of petroleum constituting an oil spill on a large body of water comprising:

an oil collection vessel;

a floatable boom assembly including at least two pivotally connected, elongated booms, each boom carrying, at the level of the water, an elongated block of material at a



cryothermal temperature corresponding to the freezing point of water at sea level or lower, which cryothermal temperature is lower than the temperature of said body of petroleum so as to increase the surface tension thereof when said elongated block of material is positioned adjacent said body of petroleum;

a guide wire assembly interconnecting said floatable guide assembly to said oil collection vessel; and

suction apparatus for removing the petroleum from said body of water and conveying same to the vessel for collection.

4,031,708

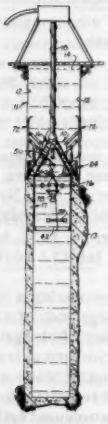
SLIPFORMING METHOD AND APPARATUS FOR IN SITU LINING OF AN UPWARDLY OPEN SHAFT WITH MONOLITHIC CONCRETE

Raymond A. Hanson, c/o R. A. Hanson Co., P.O. Box 7400, Spokane, Wash. 99207

Filed Sept. 20, 1976, Ser. No. 725,007

Int. Cl.² E21D *5/00*

U.S. Cl. 61—41 R **15 Claims**



1. A slipform for forming a monolithic concrete lining in an upwardly open vertical walled shaft filled with a liquid such as drilling mud, comprising:

an outer downwardly open form member having a lower peripheral edge of complementary configuration to the shaft cross section;

an upwardly closed inner core form member mounted to the outer form member and spaced inwardly therefrom;

an upright core wall parallel to and spaced inwardly from the shaft wall for forming the inside wall of the lining;

means for delivering concrete in a plastic state between the outer and inner form members to fill the gap between the shaft wall and core wall;

seal means on the outer form for providing a movable hydraulic seal between the outer form member and shaft wall; and

pump means for pumping liquid within the shaft from above the outer form member to pressurize the area within the shaft below the inner core member and thereby force the form members upwardly within the shaft as concrete is simultaneously received and formed against the shaft wall.

4,031,709

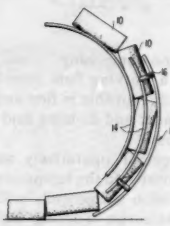
TILE DEGAPPER

John D. Blankemeyer, R.R. No. 3, Ottawa, Ohio 45875

Filed Feb. 19, 1976, Ser. No. 659,195

Int. Cl.² B65G *11/00*; **F16L** *1/00*

U.S. Cl. 61—106 **6 Claims**



1. An apparatus for detecting and correcting misaligned tiles in an automated tile laying system wherein tiles, having a cylindrical shape, open at both ends, are fed into a semicircular distribution chute in the vertical plane such that the tiles progress around and down the chute, the front edge of each tile is lapped over the rear edge of a preceding tile when in proper alignment, and no gaps occur between the tiles being placed on the ground, and when improperly aligned the front edge of a tile is lapped under the rear edge of a preceding tile causing the front edge of the tile to strike the ground a distance away from the rear of the preceding tile causing a gap in the line of tiles, said apparatus comprising:

sensing means for detecting said misaligned tile in the chute;

delaying means responsive to said sensing means for momentarily stopping the misaligned tile from progressing further down the distribution chute; and

readjustment means for positioning the misaligned tile such that when released by said delaying means said tile drops to the preceding tile with its forward edge lapped over the rear edge of the preceding tile as it is deposited on the ground.

4,031,710

EMERGENCY COOLING SYSTEM FOR AIR-CONDITIONED VEHICLES

Marvin Rideout, 8 E. 83rd St., New York, N.Y. 10028

Filed Mar. 10, 1976, Ser. No. 665,580

Int. Cl.² F28D *3/00*; **G01K** *13/00*; **B60H** *3/04*; **F28D** *5/00*

U.S. Cl. 62—171 **3 Claims**

1. Emergency cooling apparatus for a condensor of an air conditioning system of a motor vehicle comprising:

a coolant tank;

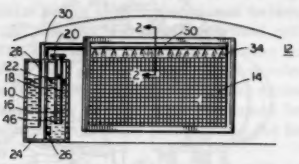
manifold means connected to said tank for spraying coolant

from said tank on a condensor of an air conditioning system of a motor vehicle;

pump means within said tank for supplying coolant from said tank to said manifold means;

control means within said tank for rendering said pump means inoperative in response to the coolant in said tank being depleted below a predetermined level, and

electric circuit means having a source of electric power and a first switch adapted to be mounted in a motor vehicle



for activating said pump means in electrical series with said power source;

said electric circuit means further including

a second normally closed switch in electrical series with said first switch; and

said control means including a float in said tank; and

said second normally closed switch being mounted in said tank so as to be opened by said float when said float reaches said predetermined level in said tank.

4,031,711

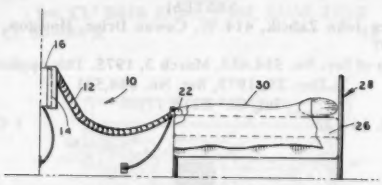
COLD AIR BLAST WAKE-UP APPARATUS

Peter MacNeil, 3680 Mountain St., Montreal, Quebec, Canada

Filed May 24, 1976, Ser. No. 689,562

Int. Cl.² F25D *23/12*; E06B *7/02*

U.S. Cl. 62—261 **2 Claims**



1. Wake-up apparatus for use in conjunction with means for air conditioning a room including a cold air outlet into said room, and a mattress located in said room, said apparatus comprising: a flexible elongated duct; coupling means at one end of said duct for attachment to said cold air outlet for enabling cold air to be fed into said duct; outlet means on the other end of said duct configured to rest on said mattress, said outlet means having a horizontally elongated outlet aperture lying in a vertical plane when said outlet means rests on said mattress for directing said cold air in a stream along the top of said mattress; an electrically controlled valve means in series with said duct having open and closed alternative positions for selectively allowing or blocking air flow through said duct, said valve means being normally in said closed position; and electrical timer means coupled to said valve means for placing said valve means in said open position at some preset time.

4,031,712

COMBINED ABSORPTION AND VAPOR-COMPRESSION REFRIGERATION SYSTEM

Frederick Alexander Costello, Herndon, Va., assignor to The University of Delaware, Newark, Del.

Filed Dec. 4, 1975, Ser. No. 637,839

Int. Cl.² F25B *15/00*

U.S. Cl. 62—483 **6 Claims**

1. In a closed cyclic absorption-refrigeration system using in combination

a. means for absorbing a vapor refrigerant in an absorbent

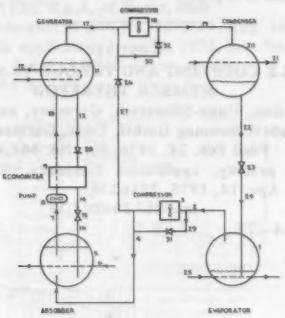
b. means for increasing the pressure on the absorbent containing the refrigerant

c. means for heating the absorbent-refrigerant mixture to drive off the refrigerant as a vapor

d. means for cooling said refrigerant vapor to condense same to a liquid

e. means for reducing the pressure on said liquid to permit same to evaporate

f. heat exchange means for cooling fluids outside the system by the evaporation of the refrigerant and



g. means for recycling the refrigerant vapor to the said absorbing means

the improvement which comprises a compressor for increasing the vapor pressure of the refrigerant vapor after it leaves the heat exchange means and before it is recycled to said absorbing means, and a compressor for increasing the vapor pressure of the refrigerant vapor after it is driven off from the absorbent-refrigerant mixture and before it enters the means for cooling to condense the refrigerant vapor.

4,031,713

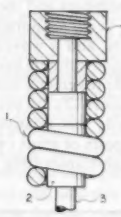
FLEXIBLE DRILL PIPE

W. B. Driver, 19 Sheridan Road, Arnold, Md. 21012

Continuation-in-part of Ser. No. 465,500, April 30, 1974, abandoned. This application Nov. 25, 1975, Ser. No. 635,136

Int. Cl.² F16C *1/02*

U.S. Cl. 64—2 P **2 Claims**



1. A flexible drill pipe for operating around the radius of bend of a curved hole or deflecting tool and the flexible drill pipe comprises, a closed pitch cylindrical spiral coil of wire rod, a female tool joint rigidly secured to one end portion of said rod, a male tool joint rigidly secured to the opposite end portion of said rod, a plurality of tube sections positioned end to end in contact within said coil or wire rod and having complete circumferential contact with said rod, said tube sections extending the full length of said coil of wire rod and contacting said tool joints at each end of said rod, flexible structure formed by said tube sections supports said coil or wire rod under high torsion loads and keeps said coil of wire rod from collapsing, all said tube sections constructed the

same permitting an even distribution of flexing moments over the length of said coil of wire rod, said tube sections each having an axial length not more than twice the diameter of said rod and not less than the diameter of said rod for support and maximum flexibility of said coil of wire rod, ends of said tube sections being blunt so the length around the inside radius of bend of the said structure formed by said tube sections will not be reduced when bent or flexed, a thin wall hose extending through said tube sections and secured to said joints at its opposite ends permit drilling fluids to be pumped through said drill pipe.

4,031,714

FLEXIBLE COUPLING AND TORQUE-TRANSMITTING MEMBER THEREFOR

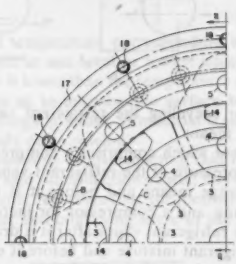
Werner Faust, Unna-Billmerich, Germany, assignor to Maschinenfabrik Stromag GmbH, Unna, Germany

Filed Feb. 24, 1976, Ser. No. 661,451

Claims priority, application Germany, Mar. 8, 1975, 2510197; Apr. 14, 1975, 2516238

Int. Cl.² F16D *3/58*

U.S. Cl. 64—12 **22 Claims**



1. A flexible coupling including a pair of coaxially arranged coupling members, a plurality of torque-transmitting members of a reinforced elastomer arranged in a circular pattern around the common axis of said pair of coupling members, each of said plurality of torque-transmitting members defining a pair of parallel stud-receiving passageways, a plurality of pairs of studs, each pair of said plurality of pairs of studs projecting through a pair of said stud-receiving passageways of one of said plurality of torque-transmitting members, one of each of said plurality of pairs of studs being supported by one of said pair of coupling members and the other of each of said plurality of pairs of studs being supported by the other of said pair of coupling members, and a woven reinforcement strip substantially spirally wound around said stud-receiving passageway wherein the improvement comprises in that said torque-transmitting members (3) are pre-stressed under compression, so as to preclude any relative movement between each of said plurality of pairs of studs (4,5, 4′, 5′) and one of said plurality of torque-transmitting members (3′, 3′) mounted thereon.

4,031,715

FLEXIBLE COUPLING ASSEMBLY

Hiriyur V. Shekar, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 12, 1975, Ser. No. 639,992

Int. Cl.² F16D *3/52*

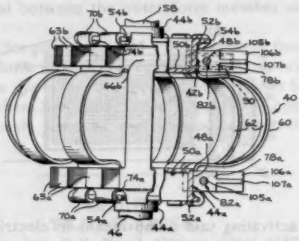
U.S. Cl. 64—15 B **6 Claims**

1. A flexible coupling assembly for connecting a driving member to a driven member comprising:

a. a first circular end plate for attachment to the driving member for rotation therewith,

b. a second circular end plate spaced from the first end plate for attachment to the driven member for rotation therewith, said first and second end plates each having a circular flat surface and at least one lug extending beyond the flat surface,

c. a one-piece flexible plastic molded body having (*i*) a collar portion at each end engaging the circular flat surface of the first and second end plates respectively, said collar portions each having two bosses for receiving fastening means to secure the collars to the first and second end plates respectively, (*ii*) a notched area to receive the



respective lugs, and (*iii*) a plurality of spaced outwardly bowed ribs interconnecting the collar portions and spanning the space between the first and second end plates,

d. fastening means holding the two bosses of each collar portion together to thereby secure the molded body to the first and second end plates,

the improvement comprising one of the two bosses on each collar portion having a pocket to receive a reinforcing fastening member.

4,031,716

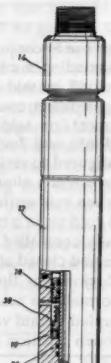
AUTOMATIC SEQUENTIAL DUAL ACTION SEALING SYSTEM

Clarence John Zabcik, 414 W. Cowan Drive, Houston, Tex. 77007

Division of Ser. No. 554,453, March 3, 1975. This application Dec. 29, 1975, Ser. No. 644,531

Int. Cl.³ E21B *17/00*

U.S. Cl. 64—23 **1 Claim**



1. In a shock absorbing subassembly including a body, a mandrel slidably and non-rotatively received in the body, means for providing limited relative longitudinal movement therebetween, dampening means between the mandrel and body for absorbing and dampening vibrations and impact loads applied to the body, upper seal means for providing a fluid tight seal between the body and the mandrel above the

dampening means, and floating seal means for providing a flulid tight seal between the body and the mandrel below the dampening means, the improvement comprising

said body having a radial fluid outlet slightly below the floating seal means;

primary annular seal means for providing a fluid tight seal between the body and mandrel below the floating seal means; and

secondary annular seal means positioned between the body and mandrel and the floating seal means and said primary seal means, said secondary seal means comprising

an annular piston slidably positioned between the body and the mandrel and said radial fluid outlet and said primary seal means, said annular piston being slidable between first and second positions proximate and remote from said primary annular seal means,

inner and outer annular seals positioned between said annular piston and the mandrel and the body, respectively,

said annular piston being provided with an orifice to facilitate low fluid flow rates through said piston and said radial fluid outlet without causing said piston to move from said first position to said second position, and

orifice seal means for sealing said orifice when said piston is in said second position.

4,031,717

PATTERNING APPARATUS FOR KNITTING MACHINES, PARTICULARLY FOR MANUFACTURING PATTERNED KNITTED PILE FABRICS ON CROCHETTING MACHINES

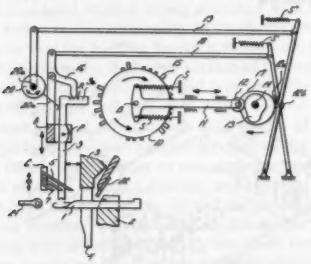
Heinz Lindner, Geyer, Erzg., Germany, assignor to VEB Wirkmaschinenbau, Karl-Marx-Stadt, Germany

Filed Apr. 19, 1976, Ser. No. 678,333

Claims priority, application Germany, May 12, 1975, 0418595

Int. Cl.² D04B *23/06, 23/08, 23/10, 23/12*

U.S. Cl. 66—84 R **10 Claims**



1. In a pattern-making device for a pile knitting machine for manufacturing patterned knitted pile fabrics, the knitting machine being of the type having a row of needles which move fore and aft and multiple pile thread guides movable between the needles, thread selecting sinkers controlled according to the desired pattern by patterning means, the thread exit openings of said multiple pile thread guide being disposed in a plane substantially parallel to the longitudinal axes of the needles, the improvement comprising means mounting the thread selecting sinkers for vertical movement perpendicular to the longitudinal axes of the needles, said mounting means including means for pivotal movement of the thread selecting sinkers intermediate the ends thereof about axes parallel to the row of needles, varying pattern spacer means positioned adjacent the upper ends of the thread selecting sinkers and constituting means for moving said thread selecting sinkers about their pivotal mounting means and for positioning the lower ends of said thread selecting sinkers adjacent any selected one thread exit opening of the multiple pile thread guide, and means for locking the thread selecting sinkers in a respective selected position relative to the corresponding exit openings of the multiple pile thread guides.

4,031,718

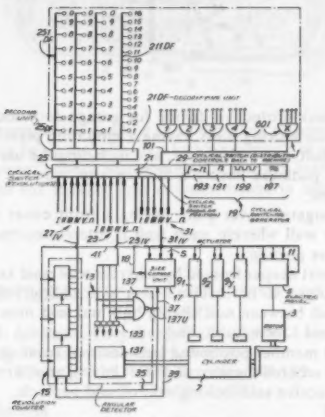
ELECTRONIC SYSTEM FOR CENTRALLY CONTROLLING A PLURALITY OF KNITTING MACHINES

Claus-Peter Luth, Florence, Italy, assignor to Macchine Tessili Circolari MATEC S.p.A. of Roma, Italy

Continuation-in-part of Ser. No. 387,514, Aug. 10, 1973, abandoned. This application June 12, 1975, Ser. No. 586,157

Int. Cl.² D04B *15/66, 15/78*

U.S. Cl. 66—154 A **5 Claims**

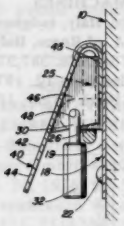


1. Electronic equipment for the control of a plurality of circular hosiery knitting machines of the type having a needle cylinder and a plurality of control members, each machine being designed to operate independently of the others, said equipment including for each machine an angular detector of the respective needle cylinder, a main revolutions counter means to count the revolutions completed by the cylinder and adapted to the zero set at the end of a cycle, a plurality of actuators including signal amplifiers, a central control unit with a signal program common for all the machines and having a input of the angular position information, an input of the revolutions number information and an output for the control information for the actuators, a quick switching assembly to temporarily and cyclically enable the central unit to receive the information from each of the machines successively and to supply the control information to the actuators of each machine in relation to the position wherein it is instantaneously located, and a size-change device for each machine and including means for receiving count pulses from the revolutions counter and the control unit, said size-change device including partial counter actuable by the counting pulses, a decoder means connected to each partial counter, a plurality of swtiches connected to each partial counter forming a plurality of pairs of swtiches, each switch of a pair having an input from one of said partial counters, the output of each corresponding pair of switches forming a coincidence circuit leading to a bistable switch, said bistable switches so connected into the system as to enable the main counter to progressively count and to interrupt the count respectively by means of a polarity inverter upon the reaching of a predetermined count and simultaneously to zero set the partial counters and respectively activate them to count during the interruption of the main counter, said switches determining the count interruption of the main counter and tus the dimensions of a corresponding portion of the hosiery are vaired.

4,031,719
LOCK-PROTECTIVE DEVICE

Lawrence R. Klingler, 124 - 20th St., Huntington Beach, Calif. 92648, and Daniel E. Shook, 2543 Orange St., Costa Mesa, Calif. 92626

Filed Oct. 8, 1976, Ser. No. 730,733
Int. Cl.² E05B 67/38; E05C 5/02
U.S. Cl. 70—56 4 Claims



1. A lock-protective device for garage-door locking units and similar locking units having a mounting plate, a slidable locking bolt, and locking ear, and including the use of various styles of padlocks having a locking arm, wherein the device comprises:

an elongated cover plate having a front cover wall and a rear wall wherein each wall is interconnected along its upper portion;

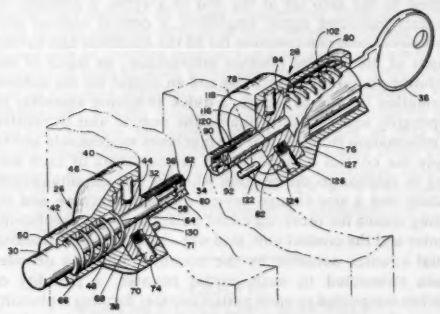
a support keeper fromed by said rear wall, said keeper being arranged to be received over said sliding bolt, and disposed between said sliding bolt and said mounting plate of said locking unit; and

a strut member positioned between said front and rear wall and secured thereto, said strut having an aperture therein to receive said locking arm of said padlock.

4,031,720
LOCKING DEVICE FOR SECURING SKIS

Mauricio V. Avalusini, 1038 S. 317th St., Federal Way, Wash.

Filed Nov. 24, 1975, Ser. No. 634,403
Int. Cl.² E05B 73/00; A63C 11/00
U.S. Cl. 70—58 4 Claims



1. Apparatus for locking a pair of skis together with their lower surfaces in juxtaposition, comprising:

a first attachment mountable onto an upper surface portion of one of said skis, comprising a lock bolt including a head portion having a non-circular cross-sectional configuration and axially inwardly directed lock surface means mounting means supporting said lock bolt for axial movement between a retracted position in which the head portion of said lock bolt is at least substantially flush with the underside of its ski, and an extended position in which the head of said lock bolt is positioned substantially beyond the underside of its ski,

a second attachment mountable onto a corresponding upper surface portion of the second ski, including means defining an orifice having a cross-sectional shape which complements but is slightly larger than the cross-sectional shape of the head portion of the lock bolt, and lock surface means immediately inwardly bounding said orifice,

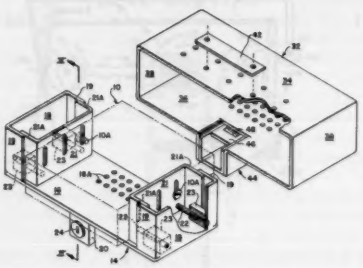
said first attachment including means for moving said lock bolt axially from its retracted to its extended position, so that when said two attachments are on two skis whose lower surfaces are juxtposed and the head portion of said lock bolt is aligned with said orifice, said head portion can be moved axially through said orifice, and

said second attachment including lock bolt rotation means for rotating said lock bolt in position after it has been extended through said orifice, to in that manner move the lock surface means on the head portion of said lock bolt angularly into a position of engagement with the lock surface means which inwardly bounds said orifice, whereby the engagement of the two lock surface means will prevent disengagement of said first and second attachments and in turn will prevent disengagement of the two skis, and for rotation of said lock bolt means back into a position in which its head portion is in pass-through alignment with said orifice, permitting separation of the two attachments and hence separation of the two skis, said lock bolt rotation means including a rotatable shaft having wrench means on an end thereof directed towards said orifice and sized to engage the head portion of said lock bolt, and key-controlled lock means connected to said shaft for controlling rotation of said shaft by operation of a key.

4,031,721
COMBINED ANTI-THEFT AND ADJUSTABLE MOUNTING ASSEMBLY FOR A CB RADIO DEVICE

Lyle V. Anderson, 122 Carriage Drive, Pittsburgh, Pa. 15237

Filed July 12, 1976, Ser. No. 704,525
Int. Cl.² E05B 73/00; F16B 41/00
U.S. Cl. 70—58 14 Claims



1. A combined anti-theft and adjustable mounting assembly for the casing of a CB radio receiver and transmitter of the type adapted for attachment to and opearable within a vehicle such as an automobile or the like, the combination comprising:

a frame including spaced-apart, upstanding side members adapted to support said casing while forming a nested relation between the side members of the frame,

spacer members adapted for attachment to the opposite sides of said casing for extending into an interlocking engagement with said side members at the opposite sides of said frame,

means to position at least one of said spacer members relative to a side member,

a housing forming an open-ended compartment to receive and support said frame together with said casing, said

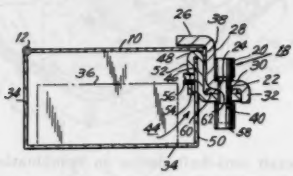
housing including a wall to carry fastening means for support by the vehicle at a desired location,
a lock box having walls secured to said housing, and
lock means carried by said frame to project into said lock box for interlocking said housing and said frame.

4,031,722

TAMPER-PROOF LOCKING DEVICE

Lionel S. Michelman, Pomona; Samuel M. Michelman; David L. Michelman, both of Queens, and Milton Michelman, Long Beach, all of N.Y., assignors to Michelman Iron Works Corporation, Brooklyn, N.Y.

Filed June 7, 1976, Ser. No. 693,293
Int. Cl.² E05B *65/52*
U.S. Cl. 70—63 **11 Claims**



1. A tamper-proof locking device mountable on a lidded container or the like comprising a first member and a second member, said first member comprising a generally zig-zag strip having three substantially right-angled bends, so that said first member is divided into four sections, with none of said sections being directly opposite to another section, an inner one of said sections being provided with at least one opening, said second member comprising a strip having a generally U-shaped section and a projecting section, said U-shaped section having a first leg and a second leg, said projecting section extending laterally outwards from and substantially perpendicular to the lower end of the first leg of said U-shaped section and being provided with at least one opening, the second leg of said U-shaped section being provided with a threaded bore, and screw means extending through the bore in said second leg, so that the locking device is mountable on a lidded container by placing the U-shaped section of the second member on a wall of a container with said legs straddling said wall and with said second leg and said screw means within the container, turning said screw means until the tip of said screw means contacts and presses against the wall of the container, closing the lid of the container so that the edge of the lid rests on the base of said U-shaped section, and mounting said first member on both the edge of the lid and the projecting section of the second member with one end section of the first member extending over the edge of the lid, one inner section of the first member overlying the first leg of the U-shaped section, the other inner section of the first member overylying the projecting member and the other end section of the first member extending over the tip of the projecting section of the second member, so that said members are attachable to each other by lock means having a shackle extending through the opening in said inner one of said sections of said first member and the opening in said projecting section of said second member.

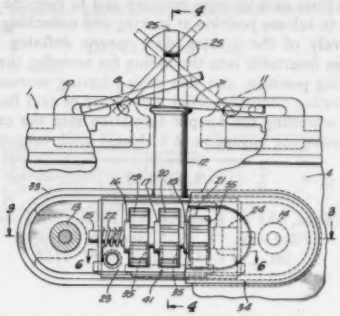
4,031,723

LOCKABLE ZIPPER CLOSURE

Clair A. Samhammer, Dana Point, and James Patrick Sullivan, Tustin, both of Calif., assignors to Samsonite Corporation, Denver, Colo.

Filed Mar. 31, 1976, Ser. No. 672,517
Int. Cl.² E05B *67/38*
U.S. Cl. 70—68 **13 Claims**

1. A lockable zipper closure which comprises at least one slider with slider pulling means having an opening therein, and means for securing said zipper closure in at least partially closed position, said securing means comprising column means comprising a portion that is longer than at least one dimension of the opening in said slider pulling means adapted



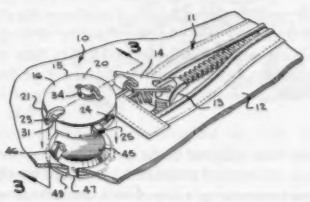
to pass through said opening in said pulling means, said column means being movable to a locking position in which said column means cannot pass completely through said opening, and means for locking said column means in said locking position.

4,031,724

KEY CONTROLLED LOCK MECHANISMS FOR ZIPPER FASTENERS

Wallace E. Atkinson, Petersburg, Va., assignor to Long Manufacturing Co., Inc., Petersburg, Va.

Filed Oct. 20, 1976, Ser. No. 734,119
Int. Cl.² E05B *65/32*
U.S. Cl. 70—68 **18 Claims**



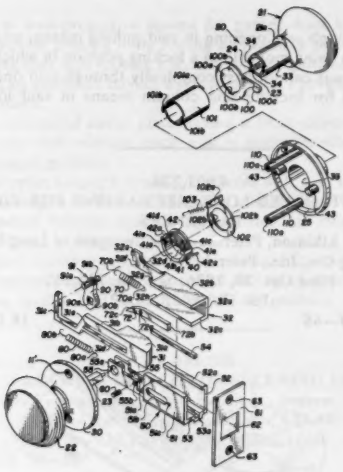
1. A key controlled lock mechanism for locking in closed position the zipper slider of a separable zipper-type fastener, comprising a lock member formed in the shape of a thick circular disc-like lock body of small axial thickness relative to its diameter, the disc-like lock body including a cup shaped casing forming a thin walled casing shell of generally cylindrical configuration having a circular front wall bounded by a rearwardly projecting annular rim flange and including a circular backing plate fastened thereto at the rearmost rear portions of said rim flange to define a cylindrical lock chamber between said backing plate and front wall, a circular latch plate having a diameter approximating the diamter of said chamber supported by sliding peripheral contact with the outwardly surrounding rim flange for rotary angular movement about the center axis of the lock body between latching and release positions and having a radially outwardly projecting finger piece extending beyond the rim flange forming a manually operable shifting tab for movement of the latch plate toward the release position, the circular latch plate having a peripheral cut-out shaped to define a circumferentially extending latch tongue adjacent its periphery and having a shaped intermediate recess near and eccentric of its center shaped to coact with a key-operable locking disc, a locking disc journaled at a fixed station in the casing for rotation in

said recess about an eccentric axis offset from said center axis having a key slot for rotation of the locking disc by a key inserted therein and having a locking surface extending in a generally circular path confronting the boundary surfaces of the intermediate recess to restrain the latch plate against rotation from said latching position and to free the same for rotation to release position at locking and unlocking positions respectively of the locking disc, means defining a keeper formation insertable into the casing for securing the slider in the closing position, and said casing having recesses for accommodating circumferential movement of said finger piece and for admitting the keeper formation into the casing into latched coupling engagement with said latch tongue.

4,031,725
DOOR LOCK

Floyd F. Reid, 603 W. Rochelle, No. 1073, Irving, Tex. 75062

Filed Aug. 11, 1975, Ser. No. 603,618
Int. Cl.² E05B *59/00;* **E05C** *1/12*
U.S. Cl. 70—107 **7 Claims**

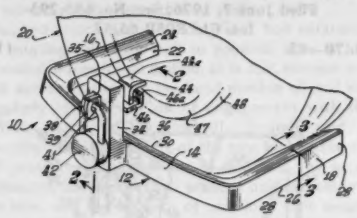


1. A door lock adapted to be mounted on a door and operated by first and second doorknobs mounted on opposite sides of said door comprising: a keyed lock associated with said first and second doorknobs, said first doorknobs being operable to activate said keyed lock by depressing and turning said doorknob and said second doorknob being operable by means of a key; a latch; means for moving said latch between a retracted unlocked position and an extended locked position; a dead bolt sleeve fitting in sliding relationship around said latch for movement between a retracted unlocked position, said latch and said dead bolt sleeve occupying a common recess in a doorjamb adjacent to said door when said latch and said dead bolt sleeve are extended to locked positions; lever means for extending said dead bolt sleeve by rotation of at least said first doorknob, said lever means being mounted on a shaft connected between and rotatable by said first and second doorknobs and being engageable with said latch responsive to rotation of either of said doorknobs in one direction to retract said latch and being engageable with said dead bolt sleeve responsive to rotation of said door knobs in an opposite direction; means for releasably locking said dead bolt sleeve at said extended locked position; means for releasing said dead bolt sleeve for movement from said extended locked position back to said retracted unlocked position by rotation of either of said first and second doorknobs; said lever means including an operator surface engageable with said means for releasing said dead bolt sleeve to release said dead bolt sleeve from said extended locked position by rotation of either of said doorknobs in said direction which retracts said latch; and means for moving said dead bolt sleeve from said first retracted position to said second extended position from the side of said door on which said second doorknob is mounted and independently of said second doorknob.

4,031,726
AIRCRAFT ANTI-THEFT CHOCK DEVICE

Garry De Jager, 6660 Riverside Drive, Chino, Calif. 91710

Filed Mar. 19, 1976, Ser. No. 668,435
Int. Cl.² B60F *3/00;* **B60T** *3/00*
U.S. Cl. 70—226 **14 Claims**



1. An aircraft anti-theft device in combination with an aircraft wheel assembly having a wheel thereon comprising:

a bifurcated chock means arranged to receive the wheel of the wheel assembly between the bifurcated portion thereof and including a forward main body base member and a pair of spaced apart laterally extending arm members at opposite ends of said base member arranged to be positioned forward and aft of said wheel assembly when arranged therewith;

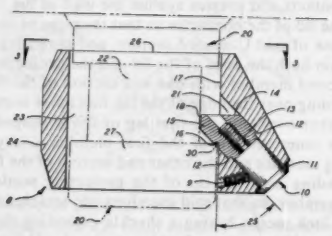
securing means having a vertical securing bar formed with said base member of said bifurcated chock means; and

securing connection means for releasable engagement between said securing bar and said wheel assembly.

4,031,727
KING PIN LOCK

Philip M. De Groat, 823 Pine St., Endicott, N.Y. 13760, and Robert A. Lewis, R.D. No. 1, Box 70, Port Crane, N.Y. 13833

Filed May 12, 1976, Ser. No. 685,643
Int. Cl.² E05B *65/12;* **B60R** *25/00*
U.S. Cl. 70—232 **7 Claims**



1. A locking mechanism, comprising;

a housing, for surrounding a device to be protected by said locking mechanism, said housing being freely rotatable about said device whether said locking mechanism is in the locked or unlocked condition;

a lock bar mounted at an acute angle within said housing;

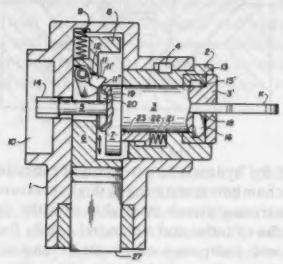
said lock bar having a bearing surface said bearing surface being cut at a second angle to prevent removal of said locking mechanism in the locked condition and to allow removal of said locking mechanism in the unlocked condition; and

a key lock mechanism for rotating said lock bar to the locked or unlocked condition.

4,031,728
STEERING COLUMN AND IGNITION LOCK FOR MOTOR VEHICLE

Rudolf Eichenauer, Hollbergstrasse 1, Frankfurt am Main, Germany (D-6000)

Filed May 17, 1976, Ser. No. 687,009
Claims priority, application Germany, Feb. 25, 1976, 2607609
Int. Cl.² B60R 25/02
U.S. Cl. 70—252 10 Claims



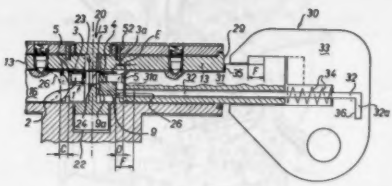
1. A lock arrangement for a motor vehicle having a steering column which comprises

1. a housing defining an axial bore and a cross bore intersecting therewith,
2. a key controlled lock cylinder mounted in the axial bore of the housing for axial displacement between an inwardly and an outwardly displaced position, and for rotation about the axis of the bore in the inwardly displaced position into selected operating positions,
3. a lock bolt mounted in the cross bore for displacement between a retracted position and a locking position, the bolt having a keeper engaging the steering column in the locking position,
4. actuating means arranged to displace the lock bolt between the retracted and locking positions, the bolt actuating means including
   a. an operating spring biassed to displace the lock bolt into the locking position and
   b. a driving member operated by the rotation of the lock cylinder to displace the bolt against the bias of the operating spring into the retracted position to disengage the keeper from the steering column, and
5. latch means mounted on the lock bolt for pivoting in the direction of the keeper, the latch means including
   a. a latch having a wedge face,
   b. a soft spring biasing the latch in a direction opposite to the pivoting direction, and
   c. the lock cylinder having an end rim adjacent the bolt, and the latch being arranged to cause the operating spring to wedge the wedge face thereof firmly against the lock cylinder rim when the bolt is in the retracted position and the lock cylinder is in the inwardly displaced position whereby the bolt is securely maintained in the retracted position, the firm wedge being removed on withdrawal of the key from the lock cylinder and the operating spring displacing the lock bolt and correspondingly driving the wedge face of the latch over the end rim to cause outward displacement of the lock cylinder.

4,031,729
EMERGENCY KEY MECHANISM ON A CYLINDER LOCK WITH A DOUBLE LOCKING CYLINDER

Heinrich Gretler, Hinwil, Switzerland, assignor to Bauer Kaba AG., Wetzikon, Switzerland

Filed Sept. 16, 1975, Ser. No. 613,897
Claims priority, application Switzerland, Sept. 26, 1974, 012999/74
Int. Cl.² E05B 17/04
U.S. Cl. 70—380 10 Claims



1. In a cylinder lock of the type having two coaxial locking cylinders each having a stator portion and a rotor portion with a key slot, a lock bolt, and a lock bolt driver rotatably mounted between the rotor portions to operate the lock bolt when rotated, the lock bolt driver having a transverse web with means defining an opening therethrough, an improved emergency key operatable mechanism comprising

a locking coupling including
an axially displaceable coupling spindle having enlarged stop portions at the opposite ends thereof;
first and second coupling members mounted on said spindle,
said members being rotatably and axially movable relative to each other and to said spindle,
each of said members further being operatively associated with one of said rotor portions, each member being rotatable with and axially movable relative to its associated rotor portion,
each of said members having a protruding portion thereof engageable with said opening in said lock bolt driver when said member and said spindle are axially displaced by insertion of a normal key of predetermined blade length in the key slot of its associated rotor portion; and
compression spring means mounted on said spindle for urging said coupling members axially outwardly toward said enlarged portions on said spindle; and
an emergency key insertable into the key slot of one of said rotor portions, said emergency key having
a blade having a length shorter than said predetermined length of said normal key, and
an operating pin extendable beyond the distal end of said blade when said emergency key is fully inserted in said slot;
the one of said coupling members operatively associated with said one of said rotor portions having a radially protruding portion engageable with said pin,
said pin being operative to axially displace said one of said coupling members into engagement with said driver whereby said rotor and said driver can be rotated by said emergency key to operate the lock without axially displacing said spindle.

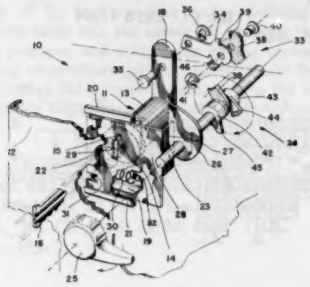
4,031,730
TAMPERPROOF LOCK AND METHOD

Michael F. Kern, 4304 Janwood, Copley, Ohio 44321

Filed Feb. 4, 1976, Ser. No. 655,096
Int. Cl.² E05B 17/14
U.S. Cl. 70—419 12 Claims

1. Apparatus to prevent tampering with a locking mechanism having an accessible keyway therein and normally rotat-

able when a key is in the keyway comprising, means normally holding the locking mechanism to prevent rotation thereof even when the key is in the keyway; blocking plate means having a slot therein normally aligned with the keyway; cam means to move said blocking plate means so that said slot and keyway are misaligned; means to release said means normally



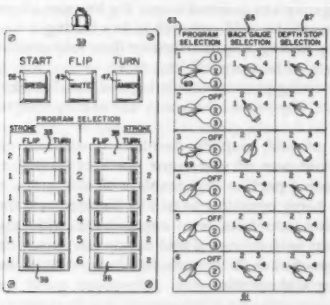
holding the locking mechanism; and movable means carrying said means normally holding the locking mechanism, said cam means, and said means to release so that movement of said movable means sequentially moves said blocking plate means to block access to the keyway, operates said means to release, and rotates said locking mechanism.

4,031,731

ALERT MEANS FOR A PROGRAMMING SYSTEM FOR PRESS BRAKES OR THE LIKE

Rolland A. Richardson, Alameda, Calif., assignor to Canron, Inc., Oakland, Calif.

Filed Mar. 26, 1973, Ser. No. 344,870
Int. Cl.² B21D 5/02
U.S. Cl. 72—37 7 Claims



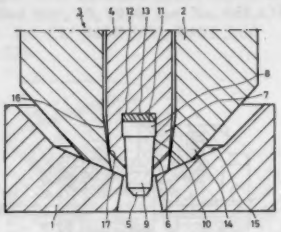
1. For use in combination with a system for programming a press brake or like machines in producing a sequence of operations on work, during which, the work must be flipped or turned in preparation for certain of said operations, means for alerting an operator as to the necessity for flipping or turning the work, and means for coordinating said alerting means with said programming system to function at the proper stages in such sequence of operations to activitate said alerting means.

4,031,732

METHOD FOR HYDROSTATIC EXTRUSION OF TUBES

Hans Larker; Erik Lundblad; Bertil Lundback, and Jan Nilsson, all of Robertsfors, Sweden, assignors to ASEA, Vasteras, Sweden

Filed May 22, 1975, Ser. No. 580,463
Claims priority, application Sweden, June 7, 1974, 7407507
Int. Cl.² B21C 25/04
U.S. Cl. 72—60 3 Claims



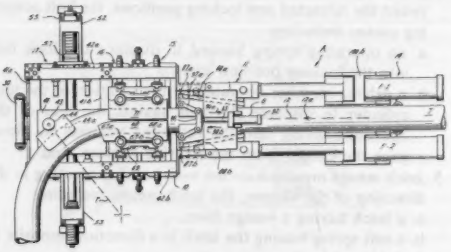
1. Method for hydrostatic extrusion of tubes in a press with a pressure chamber containing a high pressure cylinder, a pressure generating punch insertable into the cylinder, a die arranged in the cylinder and a mandrel axially fixed in relation to the die and composed of a carrier and a separate tip mounted in the carrier, which tip together with an opening in the die forms a gap in which a tubular billet having a hole therein is shaped into a tube when the billet is subjected to an all-sided hydrostatic pressure in a surrounding pressure medium, which comprises, in connection with the insertion of the tubular billet (2), producing the initial sealing between the mandrel (3) and the hole of the tubular billet (2) by contact between the front part (7) of the mandrel carrier (4) and the hollow wall of the tubular billet (2):

4,031,733

APPARATUS FOR BENDING TUBULAR MEMBERS

John L. Coody, 5514 Aldine-Bender, Rte. 16, Houston, Tex. 77032

Filed Oct. 15, 1976, Ser. No. 732,756
Int. Cl.² B21C 7/04, 7/12
U.S. Cl. 72—166 22 Claims



1. Apparatus for bending tubular members such as pipe, comprising:

a frame;

gripping means for gripping said tubular member, said gripping means being mounted on said frame for movement between an initial and final position in a longitudinal direction;

feed means mounted with said frame and attached to said gripping means for moving said gripping means between said initial and final positions;

bending means for bending said tubular member as said feed means moves said gripping means gripping said

tubular member from said initial to said advanced position, said bending means including:

a set of bending dies for receiving and bending a tubular member and bending die mount means mounting said bending dies with said frame for adjustable movement in a direction transverse to said longitudinal axis; and

a radius setting assembly and radius mount means mounting said radius setting assembly for movement between an initial and a radius applying position in a direction transverse to said longitudinal axis, said radius setting assembly and bending dies cooperating to engage and bend a tubular member to a desired radius with said feed means moving said gripping means from said initial to said final position; and

power control means controlling movement of said gripping means, feed means, bending dies and radius setting assembly, said power control means including means for synchronizing movement of said radius setting assembly with movement of said gripping means and said feed means.

4,031,734
METHOD FOR THE PRODUCTION OF CONCENTRIC MACHINE ELEMENTS

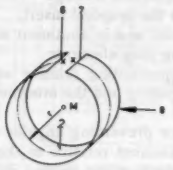
Helmut Imme, Friedberg, and Werner Moser, Augsburg, both of Germany, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Division of Ser. No. 524,490, Nov. 18, 1974, Pat. No. 3,950,044. This application Sept. 9, 1975, Ser. No. 611,683

Claims priority, application Germany, Dec. 22, 1973, 2364223

Int. Cl.² B21D *53/10*

U.S. Cl. 72—368 **2 Claims**



1. A method for forming a bearing shell comprising forming a flat strip of elastic material to be permanently bent to have an arcuate cross-section, with a longitudinally extending convex surface on one side and a longitudinally extending concave surface on the other side thereof, and then bending the ends of said permanently bent strip around an axis transverse of the longitudinal axis of said strip and spaced from said first side of said strip to form an arcuate casing that retains its arcuate shape.

4,031,735
APPARATUS FOR JOINING WIRES

John Patrick Harding, Bushey; David Sydney Butler, Hassocks, and Graham Keith Whitehead, Harefield, Uxbridge, all of England, assignors to The Post Office, London, England

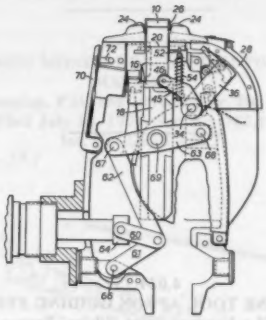
Filed Feb. 24, 1976, Ser. No. 660,979

Claims priority, application United Kingdom, Feb. 27, 1975, 8270/75

Int. Cl.² B21D *7/06*

U.S. Cl. 72—394 **5 Claims**

1. Apparatus for joining together a pair of wires by deforming a crimping clip to grip and thereby join the wires, the apparatus including crimping jaws which are movable into a crimping position to deform the crimping clip; a support member which is adapted to carry the clip and is also movable into a crimping position to co-operate with the jaws in the deformation of the clip, and a toggle linkage for moving the crimping jaws and support member, the toggle linkage being operable to develop an output force which varies with the condition of the toggle and increases as the jaws and support member move towards the crimping position, said toggle linkage comprising a driving link; two linkage members each pivotally



coupled at one end to the driving link, the other end of one of the linkage members being fixed; and an actuating link which is pivotally coupled at one end to the other end of the second linkage member, the actuating link being fixed at its other end and being connected to move the jaws and support member.

4,031,736
WORKPIECE MANIPULATOR FOR USE IN A FORGING PRESS

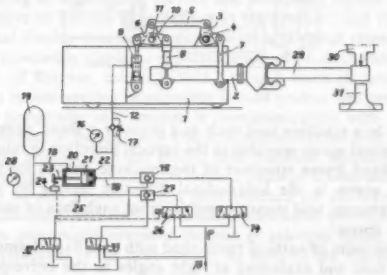
Heinrich Kutz, Neuss, Germany, assignor to Schloemann-Siemag Aktiengesellschaft, Germany

Filed July 14, 1976, Ser. No. 705,016

Claims priority, application Germany, July 24, 1975, 2533055

Int. Cl.² B21D *43/10*; **B21J** *13/10*

U.S. Cl. 72—422 **3 Claims**



1. A workpiece manipulator for use with a forging press, the manipulator comprising:

a mobile chassis;

a pair of tongs for gripping a workpiece;

a tongs holder to which the tongs are attached;

a parallel motion linkage connecting the tongs holder to the chassis;

a hydraulic piston/cylinder actuating unit for actuating the linkage to cause the tongs holder to be moved with a parallel motion;

a hydraulic circuit connected to said actuating unit;

a second piston/cylinder unit in said circuit, the piston of which is biassed on one side by hydraulic fluid from said actuating unit; and

a pressure reservoir in said circuit, which contains hydraulic

fluid which biasses the other side of the piston of said second unit,

whereby an increase in pressure in said actuating unit causes the piston of the second unit to move against the pressure from the pressure reservoir to allow movement of the actuating unit piston to move the tongs holder.

4,031,737

MACHINE TOOL APRON GUIDING SYSTEM

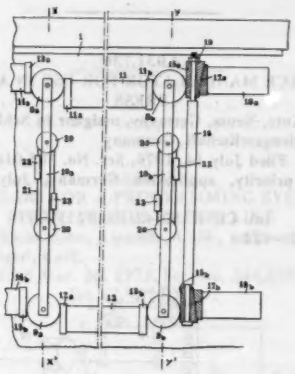
Paul Cailloux, La Varenne Saint Hilaire, France, assignor to Promecam Sisson-Lehmann, Saint-Denis, France

Filed Jan. 14, 1976, Ser. No. 649,098

Claims priority, application France, Jan. 24, 1975, 75.02255

Int. Cl.² B21J 13/04

U.S. Cl. 72—456 10 Claims



1. In a machine tool such as a press or a shear, comprising a vertical apron movable in the vertical direction in relation to the fixed frame structure of the machine, means for guiding said apron in the longitudinal direction during its vertical movements, said means comprising on each face of said movable apron:

two pairs of vertical races rigid with said fixed frame structure and extending at right angles to the corresponding face of said movable apron, the two races of one of said pairs registering with two races of one of two pairs of races carried by said movable apron to form a first group of races, said other two races carried by said movable apron forming with said two races of said other pair of races rigid with said fixed frame a second group of races;

two pairs of rollers disposed in two spaced vertical planes respectively between the races of said first and second groups which are in part rigid with the movable apron and in part rigid with said fixed frame structure, respectively, and

tightening means adapted to produce a horizontal pressure for clamping at least some of said vertical races against the corresponding rollers, said tightening means being associated with the races formed on one side of one of said pairs of rollers.

4,031,738

PLUG FOR PLUG ROLLING

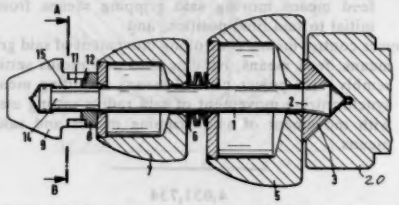
Wolfram Schönfeld, Meerbusch-Osterrath; Armin Philipps, and Fritz Runkel, both of Dusseldorf, all of Germany, assignors to Mannesmannrohren-Werke AG., Mannesmann-Hochhaus, Germany

Filed Aug. 21, 1975, Ser. No. 606,367

Claims priority, application Germany, Aug. 22, 1974, 286649

Int. Cl.² B21B 25/00

U.S. Cl. 72—478 3 Claims



1. Plug for plug rolling mills to be connected to a mandrel and having

a first plug element, being the primary working plug in abutment with the mandrel, an intermediate plug element, and a guiding plug element, the improvement comprising:

a tie rod threadedly received with one end by the guiding plug element and having a cone for connection to a mandrel insert on the other end, the first and intermediate plug elements being traversed by the tie rod;

resilient means interpositioned between the first and intermediate plug elements through which the latter urges the former against the mandrel insert;

a spacer interposed and in abutment with the intermediate and the guiding plug elements;

first means for preventing relative angular displacement between the guiding and the intermediate plug elements; and

second means for preventing angular displacement of the guiding plug element relative to the tie rod, so that by operation of the first and second means the guiding element is prevented from unscrewing.

4,031,739

AUTORANGING METHOD AND SYSTEM FOR TESTING THE SPEEDS OF A CAMERA SHUTTER

Barry R. Springer, 35 Northwood Drive, Nashua, N.H. 03060

Filed July 22, 1976, Ser. No. 707,573

Int. Cl.² G03B 43/02

U.S. Cl. 73—5 14 Claims

1. A method for measuring shutter speed in the camera comprising:

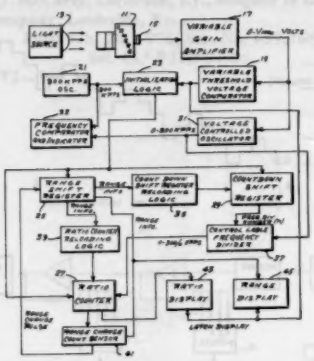
a. positioning the shutter adjacent to a light source;

b. activating the shutter causing a pulse of light to pass therethrough;

c. sensing the intensity and duration of the light pulse;

d. automatically displaying a standard shutter speed which

most accurately represents the effective speed of the tested shutter; and



e. displaying an error ratio relating the effective speed of the shutter tested to the standard speed display.

4,031,740
APPARATUS FOR THERMOANALYTICAL INVESTIGATIONS

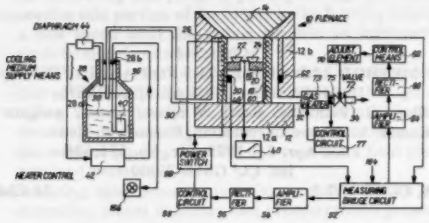
Heinz Achermann, Uster, Switzerland, assignor to Mettler Instrumente AG, Zurich, Switzerland

Filed May 12, 1975, Ser. No. 576,668

Claims priority, application Switzerland, June 25, 1974, 8666/74

Int. Cl.² G01K *17/00*

U.S. Cl. 73—15 B **13 Claims**



1. An apparatus for thermoanalytical investigations at low temperatures, comprising:

a. a furnace having a furnace chamber for receiving an article to be investigated;

b. means for ascertaining the temperature of the article or a parameter of the article that characterizes the temperature of the article;

c. means for controlling the temperature in the furnace chamber to a desired value following a predetermined temperature versus time program, said controlling means including

1. means for pre-setting said desired value;

2. means for heating the furnace chamber; and

3. a sensor cooperating with the furnace for measuring the temperature in the furnace chamber;

d. a hollow cooling medium chamber having an inlet and an outlet through which flows a cooling medium, said cooling medium chamber being separated from the furnace chamber but being disposed adjacent thereto and adjacent to said heating means;

e. supply means connected to the cooling medium chamber for supplying cooling medium thereto; and

f. means for controlling the temperature of the cooling medium near said outlet to a desired value following a predetermined temperature versus time program, said controlling means including

1. means for pre-setting said desired value;

2. a sensor cooperating with the cooling medium chamber for measuring the temperature of the cooling medium near said outlet; and

3. means for quantitatively controlling the throughflow of cooling medium through the cooling medium chamber.

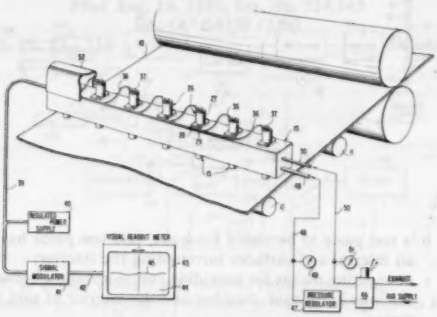
4,031,741
FLATNESS MONITORING SYSTEM FOR STRIP MATERIAL

Edward Schaming, P.O. Box 1070, Butler, Pa. 16001

Filed July 14, 1976, Ser. No. 705,175

Int. Cl.² G01B *13/22*

U.S. Cl. 73—37.7 **7 Claims**



1. An apparatus for monitoring flatness in a moving strip product comprising a manifold spanning substantially the width of the moving product and mounted in spaced relation to one face thereof, plural spaced pneumatic sensing probes on the manifold having pneumatic discharge passages for directing pneumatic streams against the opposing face of the product without physical contact between the probes and product, the probes floating on the back pressures of said pneumatic streams and maintaining uniform gaps between their tips and said opposing face of the product, coacting electrical signal transmitters connected with the probes and responding to movements thereof and producing signals representative of flatness irregularities in the product, and visual electrical display means connected with said signal transmitters to constantly display a representation of product flatness or lack of flatness, said manifold having a main pneumatic passage in intersecting relationship to said probes, the probes having pneumatic inlet means in communication with said main pneumatic passage and also in communication with said discharge passage of each probe, said manifold additionally having a separate secondary pneumatic passage in intersecting relation to said probes, and a piston means on each probe communicating with said secondary pneumatic passageway whereby pneumatic pressure therein at selected times can cause retraction of the probes into the body of the manifold.

4,031,742
LEAK DETECTOR USING MASS CONCENTRATION GAUGE

Gerald C. Michael, 5946 Linton Lane, Indianapolis, Ind. 46220, and Murvyn M. McDowell, 721 Coleman Ave., Fairmont, W. Va. 26554

Continuation-in-part of Ser. No. 469,966, May 13, 1974, abandoned, which is a continuation of Ser. No. 295,913, Oct. 10, 1972, abandoned. This application Feb. 11, 1975, Ser. No. 549,093

Int. Cl.² G01M *3/04*

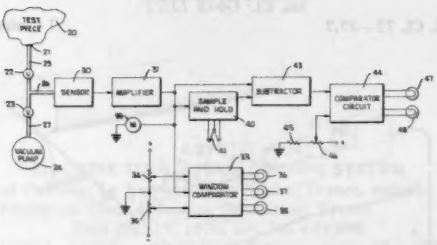
U.S. Cl. 73—40.7 **38 Claims**

1. A device useful for detecting leaks which comprises:

a. means for measuring the mass concentration of a gas

essentially independently of the temperature of the gas, said means including:

1. a chamber,
2. two electrodes spaced apart from each other, the space between them being within said chamber,
3. a radioactive source placed near said electrodes to ionize any gases which may exist between said electrodes,
4. impedance measuring means for applying a voltage across said two electrodes and for detecting current flowing between said two electrodes when voltage is applied across said two electrodes;



b. a test piece to be tested for leaks, said test piece having an interior and surfaces surrounding the interior;

c. connecting means for providing communication between the interior of said chamber and the interior of said test piece;

d. a valve; and

e. pressure means communicating with said test piece through said valve for creating a pressure differential between the interior and the exterior of said test piece, whereby after closure of the valve a subsequent change of mass concentration within said test piece is indicative of a leak.

4,031,743

ULTRASONIC ECHOGRAM DISPLAY

George Kossoff, Northbridge, and David Errol Robinson, Avalon Beach, both of Australia, assignors to The Commonwealth of Australia, c/o Dept. of Health, Phillip, Australia

Continuation-in-part of Ser. No. 466,791, May 3, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,347

Claims priority, application Australia, May 3, 1973, 3195/73

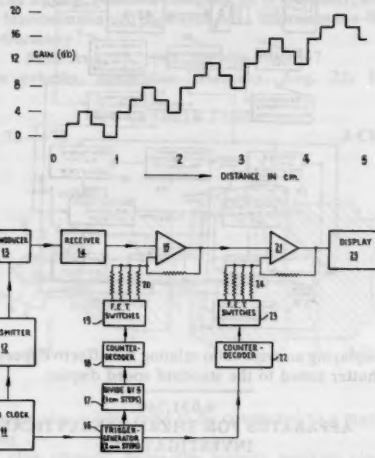
Int. Cl.² G01S 9/66; G01N 29/04

U.S. Cl. 73—67.8 R **6 Claims**

1. In a method of ultrasonic examination of an object comprising the steps of transmitting pulses of ultrasonic energy into the object, and receiving by receiver means echoes of said pulses of ultrasonic energy reflected by acoustic impedance discontinuites within the object, the improvement comprising:

progressively increasing the gain of said receiver means in predetermined steps during the time between transmitter pulses to compensate for attenuation of said echoes within the object; and

cyclically altering the gain of said receiver means during each of said predetermined steps by stepping the receiver



gain through a cycle of discrete steps superimposed upon each of said predetermined steps.

4,031,744

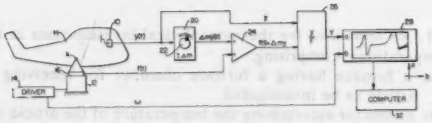
METHOD AND APPARATUS FOR ANALYZING A DAMPED STRUCTURAL SPECIMEN

William G. Flannelly, South Windsor, Conn., assignor to Kaman Aerospace Corporation, Bloomfield, Conn.

Filed Apr. 25, 1975, Ser. No. 571,636

Int. Cl.² G01N 29/00

U.S. Cl. 73—67.2 **34 Claims**



1. A method of determining an undamped physical response characteristic from a damped specimen comprising:

exciting the damped specimen to produce physical responses over a range of forcing frequencies of interest;

producing two signals representing respectively the excitation and the corresponding physical responses produced;

combining with one of the produced signals a signal proportional to the other of the produced signals by a known constant of proportionality to thereby produce a third signal;

dividing the third signal into said other of the signals to obtain a fourth signal representative of a modified response characteristic of the damped specimen over the range of forcing frequencies of interest;

determining the frequencies at which the modified response characteristic indicates a resonant condition; and

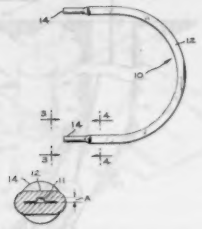
determining from the known constant of proportionality an undamped value of the response characteristic at the frequencies indicating the resonant condition.

4,031,745

METHOD OF FORMING CONSTRICTION IN TUBING

William J. McCarty, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Feb. 20, 1976, Ser. No. 659,768
Int. Cl.² B21D 31/06
U.S. Cl. 72—367 3 Claims



1. The method of forming a capillary tube for connection into a refrigeration system which comprises:

forming at least one longitudinally disposed groove in the internal wall of a length of tubing;

forming said length of tubing longitudinally into a preselected configuration so that the free ends thereof are arranged to connect with said refrigeration system, including at least one portion intermediate said ends being in a single plane;

placing said portion of said tubing intermediate said free ends in a forming means;

connecting at least one of said free ends to a source of constant pressure through a control means having means for measuring said pressure passing through said tubing;

squeezing said portion of the tubing in the forming means at a first speed until the tubing reaches an intermediate predetermined restriction; then

squeezing said portion of tubing at a second slower speed so that substantially all of the medium passing through said tubing travels through said groove, and continuing said slower speed squeezing until the groove restriction causes the medium passing therethrough to reach a final predetermined pressure; and

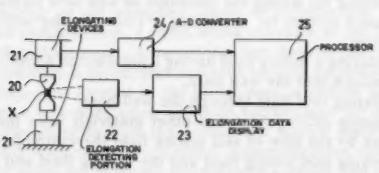
terminating said second squeezing operation when said measuring means indicates said predetermined pressure.

4,031,746

AUTOMATIC TENSILE TEST APPARATUS

Isao Furuta, Suzuka; Shinsuke Iwamoto, Kyoto; Hironari Kuga, Muko, and Yoshishige Chikatsu, Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo and Iwamoto Seisakusho Company Limited, Kyoto, both of, Japan

Filed Apr. 29, 1976, Ser. No. 681,758
Claims priority, application Japan, Aug. 26, 1975, 50-103351
Int. Cl.² G01N 3/08
U.S. Cl. 73—95 10 Claims



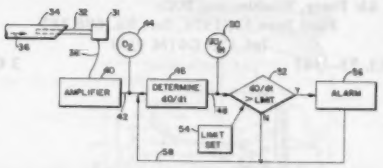
1. Automatic tensile test apparatus comprising a portion for detecting an elongational strain of a test specimen, said portion including sensors which optically detect movements in elongating directions of both boundary marking lines between said specimen and a light reflecting substance applied thereon and a follow-up device which cooperates with said sensors; means to detect a tension exerted on said specimen; means to detect break of said specimen in cooperation with the elongation strain detecting portion; and a data processor which continuously calculates and processes the detected elongation and tension of said specimen.

4,031,747

MISFIRE MONITOR FOR ENGINE ANALYSIS HAVING AUTOMATIC RESCALING

John David Blanke, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Aug. 16, 1976, Ser. No. 714,143
Int. Cl.² G01M 15/00
U.S. Cl. 73—116 7 Claims



1. In engine exhaust gas analysis apparatus having:

means for sampling the exhaust gases including means for generating a first signal indicating the amount of a component present in the exhaust gases;

differentiating means connected to said sampling means and including means responsive to said first signal for generating a second signal indicating the rate of change of said first signal with respect to time;

means connected to said differentiating means for comparing said second signal to a limit; and,

means connected to said comparing means for indicating when said second signal exceeds said limit, the improvement comprising:

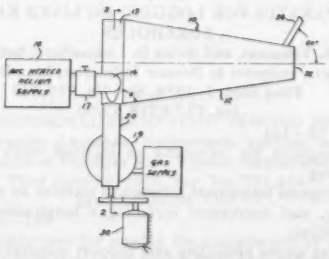
means for causing the values of said second signal and said limit to be normalized to a standard range before said comparing is done whereby the exceeding of said limit by said second signal will have substantially the same meaning regardless of the engine being analyzed.

4,031,748

VORTEX FLOW PARTICLE ACCELERATOR

Kenneth R. Cramer, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 11, 1976, Ser. No. 685,247
Int. Cl.² G01M 9/00
U.S. Cl. 73—147 4 Claims



1. A particle accelerator comprising: a substantially frusto

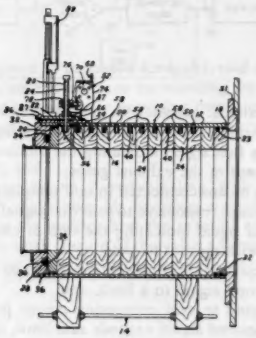
conically shaped flow chamber; said flow chamber having a zero taper entrance portion at the larger end of said flow chamber; an axial exit at the end of said flow chamber remote from said zero taper section; means for supplying a high pressure low molecular weight gas tangentially to the zero taper section of said flow chamber to thereby provide a vortex gas flow within said flow chamber; means for supplying small solid particles into the gas flow within said flow chamber at the zero taper section of said flow chamber and means for removing said particles from said chamber substantially along the maximum flow velocity vector of said particles within said flow chamber.

4,031,749

PROBE SYSTEM FOR WIND TUNNEL TEST SECTION

Buryl L. McFadden, Jr., Green County, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 15, 1976, Ser. No. 696,342
Int. Cl.² G01M 9/00
U.S. Cl. 73—147 **3 Claims**



1. A wind tunnel test section, comprising: an outer cylindrical shell member; a cylindrical inner liner positioned within said shell member; a pair of bearing members at opposite ends of said liner member, between the liner member and the outer shell member; a plurality of probe retainer plugs in said liner member, adapted to support a test probe within the test section; a plurality of elongated circumferentially positioned slots in said outer shell member positioned adjacent said probe retainer plugs; means for rotating said inner liner member within said outer shell member, to thereby move said probe retainer plugs along the slots in said outer shell member.

4,031,750

APPARATUS FOR LOGGING INCLINED EARTH BOREHOLES

Arthur H. Youmans, and Heinz D. Lichtenberg, both of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Sept. 2, 1976, Ser. No. 719,749
Int. Cl.² E21B 47/00
U.S. Cl. 73—151 **7 Claims**

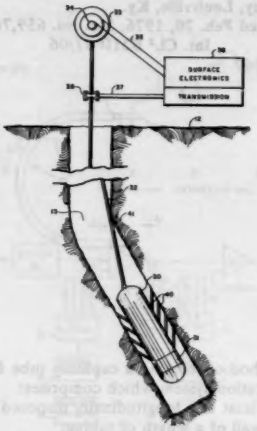
4. Apparatus for traversing an inclined earth borehole, comprising:

an elongated instrument adapted to traverse an earth borehole, said instrument including a longitudinal support mandrel;

a sliding sleeve encircling said support mandrel;

at least one vane attached to said sleeve and having a given angle with respect to said sleeve; and

means to reciprocate said sleeve with respect to said mandrel and thereby impart motion to the instrument in a



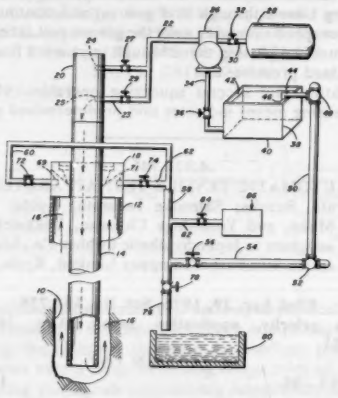
direction away from the angled slant of said at least one vane.

4,031,751

CLOSED SYSTEM FOR TESTING THE CONDITION OF WELL BORE FORMATIONS

Richard Y. Haddad, Pittsburgh, Pa., assignor to Haddad and Brooks, Inc., Upper St. Clair, Pa.

Filed Sept. 22, 1976, Ser. No. 725,635
Int. Cl.² E21B 47/00
U.S. Cl. 73—155 **11 Claims**



1. Method for testing the condition of well bore formations in a closed system for cementing a casing in the well bore comprising,

introducing a testing fluid having a preselected density from a source into the well bore,

circulating said fluid through the well bore,

displacing drilling fluid and other materials from the well bore by the flow of said testing fluid therethrough,

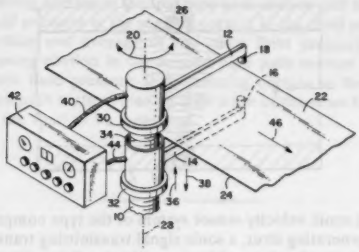
conveying said testing fluid and the drilling fluid and other materials from the well bore, and

monitoring samples of the flow from the well bore for the presence of gas emitted from formations surrounding the well bore.

4,031,752
WEB PROCESS CONTROL APPARATUS

Art Sanders, 230 Harvie Road, East, R.R. No. 5, Barrie, Ontario, Canada

Filed July 19, 1976, Ser. No. 706,226
Int. Cl.² G01N *33/34*
U.S. Cl. 73—159 4 Claims

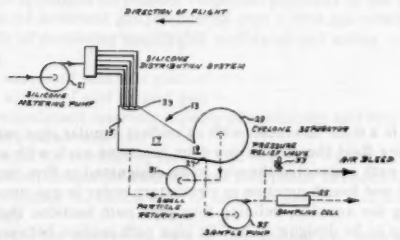


1. A process control and measuring apparatus comprising a pair of parallel arms disposed in spaced apart relationship, a web travelling between said arms, said arms commonly pivotably secured to a shaft, said shaft having the longitudinal axis thereof disposed perpendicular to the surface of said plane, said arms describing substantially a ninety degree arc at the free ends thereof, said arc passing about the surfaces of said web, measuring means fixedly secured to a free end of one of said arms, coupling means for coupling the signal generated by said measuring means to a point remote from said shaft post.

4,031,753
TOTAL WATER CONTENT INSTRUMENT

Richard G. Hooper, La Crescenta, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 20, 1976, Ser. No. 716,304
Int. Cl.² G01N *1/00*
U.S. Cl. 73—170 R 4 Claims

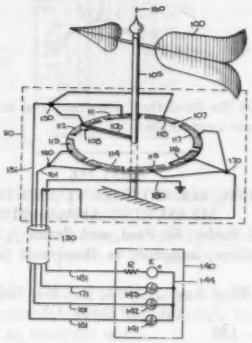


1. An instrument for sampling both solid and liquid water particles in the atmosphere and continuously producing an electrical signal directly equivalent to the total percentage water content of the atmosphere sampled, said instrument comprising an air sampling scoop of substantially funnel shaped configuration, a fixed intake aperture at the forward end of said air scoop, a narrowing area downstream said intake aperture, a throat area downstream said narrowing area, a suction port located in the throat area, a sample pump in operative communication with said suction port for drawing the water particles from the atmosphere sample therefrom, a sampling capacitor in operative communication with said sample pump for receiving the output therefrom and producing an electrical signal proportional to the water content of the atmosphere sample, and means at the throat of said air scoop for spinning out water particles which are swept past said suction port and returning the spun out water particles to the intake aperture of said air scoop.

4,031,754
APPARATUS FOR WEATHER PREDICTION

James Charles Bedard, 22 Foster Lane, Westbury, N.Y. 11590

Filed Jan. 19, 1976, Ser. No. 650,051
Int. Cl.² G01W *1/00*
U.S. Cl. 73—188 7 Claims



1. Apparatus for predicting weather conditions solely on the basis of present wind direction comprising:
- means for producing a physical indication of the present wind direction,
- means responsive to said physical indication of the present wind direction for generating a plurality of signals, each of said signals corresponding to a particular wind direction, and
- means for converting said signals into visual indications of future weather conditions comprising
- means for selectively combining said signals to yield a set of three signals, and
- means responsive to each of said three signals for generating visual indications of weather conditions corresponding to fair, changing or unsettled conditions.

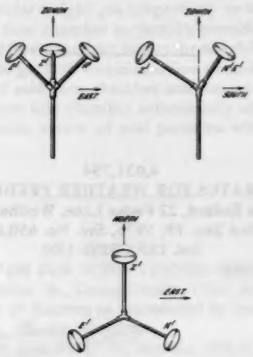
4,031,755
TRI DIMENSIONAL FLUID FLOW SENSING DEVICE

Pierre Ravussin, Lausanne, Switzerland, assignor to Alcyon Electronique et Physique S.A., Renens, Switzerland

Filed June 30, 1976, Ser. No. 701,454
Int. Cl.² G01W *1/02*
U.S. Cl. 73—189 6 Claims

1. An instrument for sensing the components of a vector repesenting fluid flow comprising a first, a second and a third arm each bearing fluid flow sensing propeller means, said arms

extending from a common origin in directions each of which is at the same angle of inclination from the direction nominally



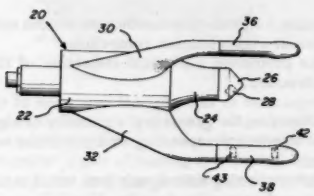
orthogonal to the fluid flow direction and means for measuring said vecotr components.

4,031,756

ULTRASONIC AIR MOVEMENT AND TEMPERATURE MEASURING APPARATUS

Donald Jack Rotier, St. Paul, and Frank J. Ferrin, Wayzata, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 2, 1976, Ser. No. 710,980
Int. Cl.² G01F 1/66
U.S. Cl. 73—189 **10 Claims**



6. A gaseous movement and temperature sensing apparatus comprising:

an ultrasonic wave transmitting transducer means comprising a common support element having a conical outer surface with three transmitting transducer elements mounted in the conical surface and displaced relative to each other by approximately 120°, three separte ultrasonic receiver transducer means spatially positioned about said transmitting transducer means and each aligned with one each of said transmitting transducer elements along a line extending perpendicular from said conical surface; and a fourth receiver transducer spatially positioned from one of the transmitting transducers at a position displaced from a lone perpendicular from said conical surface;

an ultrasonic wave energy source connected to said transmitting transducer means to activate said transmitting transducer means to project ultrasonic wave energy from each of said transducer elements toward said receiver transducer means;

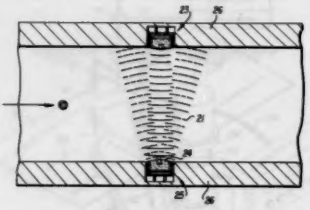
and means connected to said receiver transducer to measure the time difference in the received signals received by said four receiving transducer means and thereby the relative movement and temperature of a gaseous medium passing said sensing apparatus.

4,031,757

SONIC TRANSDUCER SURFACES

Russell F. Colton, Cedar Rapids, Iowa, assignor to J-Tec Associates, Incorporated, Cedar Rapids, Iowa

Filed Dec. 8, 1975, Ser. No. 638,356
Int. Cl.² G01F 1/32
U.S. Cl. 73—194 VS **5 Claims**



1. In a sonic velocity sensor system of the type comprising a vortex generating strut, a sonic signal transmitting transducer, and a sonic signal receiving transducer, the improvement wherein:

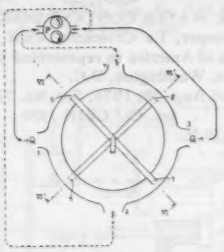
at least one of said sonic signal transducers is formed of a single integral crystal which has a conically-shaped faced surface.

4,031,758

MASS FLOWMETER

Nobuo Doi, Kanan-cho Daigatsuka 60, Minamikawachi, Osaka, Japan (585)

Filed Dec. 29, 1975, Ser. No. 645,231
Int. Cl.² G01F 1/34
U.S. Cl. 73—205 D **3 Claims**



1. In a mass flowmeter with an endless annular pipe path for passing fluid therein, having four junctions each with a spur pipe path connected thereto, to be designated as first, second, third and fourth junction in circulatory order in any direction along the annulus, defining four pipe path sections therebetween to be designated as first pipe path section between the first and second junction, second pipe path sections between the second and third junctions, third pipe path section between the third and fourth junctions, and fourth pipe path section between the fourth and first junctions; the first junction serving as inlet of the fluid to be measured and the third junction as outlet thereof, while the second junction serving as inlet of the fluid recirculated at constant volumetric flow rate by recirculation means provided outside of said annular path and the fourth junction as outlet of the recirculation flow for returning to the recirculation means; the improvement comprising:

a. a static fluid pressure sensing portion provided in an intermediate portion of each of the pipe path sections;

b. the annular pipe path, including the shape and configuration of the static fluid pressure sensing portions, being constructed in mirror-image symmetry with respect both to a plane including a line connecting center axis of the

first junction and center axis of the third junction, and partitioning the second and fourth junctions on either side thereof, and to a plane including a line connecting center axis of the second junction and center axis of the fourth junction, and partitioning the first and third junctions on either side thereof; and

c. transducer means for transducing pressure difference between the average of the static fluid pressure at the sensing portion in the first pipe path section and the static fluid pressure at the sensing portion in the third pipe path section and average of the static fluid pressure at the sensing portion in the second pipe path section and the static fluid pressure at the sensing portion in the fourth pipe path section, into an indication of the mass flow rate of the fluid to be measured.

4,031,759

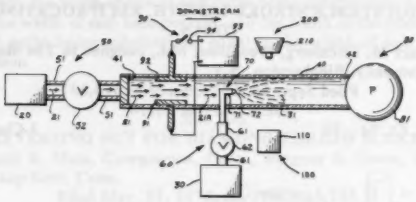
METHOD OF, AND APPARATUS FOR, MAKING VISIBLE THE FLOW PATTERN OF A GAS

Claude R. Jones, Los Alamos, N. Mex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 12, 1976, Ser. No. 713,748

Int. Cl.² G01M *13/00*; G01F *15/00*

U.S. Cl. 73—432 R **10 Claims**



1. An apparatus for making visible the geometry of the flow pattern of a second gas introduced into a first gas which is capable of producing metastable molecules and atoms, comprising:

a. a source of said first gas;

b. a source of said second gas;

c. a translucent reservoir capable of containing said first gas and said second gas;

d. means for controlling flow of said first gas, with said flow control means for said first gas interposed between, and connected to, said source of said first gas and said reservoir;

e. means for controlling flow of said second gas, with said flow control means for said second gas interposed between, and connected to, said source of said second gas and said reservoir;

f. means for introducing said second gas into the flow of said first gas, within said reservoir, with said second gas introduction means connected to said reservoir;

g. means for promoting flow of said first gas and of said second gas into and within said reservoir, with said flow promoting means connected to said reservoir;

h. and, means for producing metastable molecules and atoms of said first gas, within said reservoir, with said production means connected to said reservoir; whereby, when metastable molecules and atoms of said first gas are produced in said reservoir, they transfer their energy to said second gas, thereby causing said second gas to emit visible light, and thereby making visible the geometry of the flow pattern of said second gas.

4,031,760

APPARATUS FOR BALANCING MACHINES FOR CHUCKING AND CENTERING OF ANAXIAL BODIES OF ROTATION

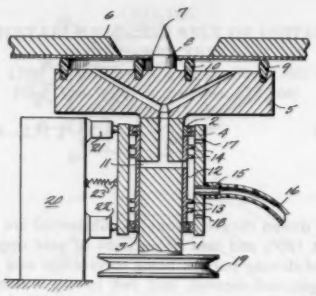
Richard Muller, Lynchburg, Va., assignor to Gebr. Hofmann KG, Darmstadt, Germany

Filed Apr. 14, 1976, Ser. No. 676,674

Claims priority, application Germany, May 20, 1975, 2522260

Int. Cl.² G01M *1/04*

U.S. Cl. 73—460 **3 Claims**



1. An apparatus for clamping and centering bodies during rotation for balancing comprising:

a body receiving plate having an upper extending surface and a plurality of channels extending therethrough into a chamber,

a spindle coupled to said plate for rotating the same and having a passage extending therethrough between said channels and an enclosed space,

a bearing housing enclosing said spindle,

a plurality of bearings disposed between said housing and said spindle,

a first flexible ring attached to and extending upward from said surface,

a second flexible ring attached to and extending upward from said surface and extending about said first ring to form said chamber which is sealed by a body resting on said rings,

means for producing a vacuum in said chamber by removing air from said chamber via said channels, said passage and said enclosed space to clamp said body to said upper extending surface, and

a centering cone extending upward from said surface within said first ring.

4,031,761

ENGINE POWER TAKE-OFF SYSTEM WITH SINGLE BELT DRIVE

David G. Fisher, and Robert G. Gladden, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Continuation of Ser. No. 551,477, Feb. 20, 1975, Pat. No. 3,951,006, which is a continuation of Ser. No. 390,448, Aug. 22, 1973, abandoned. This application Apr. 16, 1976, Ser. No. 677,860

The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.

Int. Cl.² F16H *7/02*; F16G *5/08*, *5/20*

U.S. Cl. 74—15.63 **5 Claims**

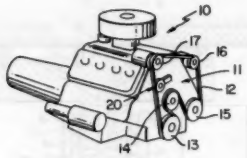
1. An improved automotive belt drive system comprising:

an automotive engine having a driving sheave coupled thereto for rotation;

at least three accessory devices each having a driven sheave coupled thereto, wherein each drive sheave is adapted to supply power to its respective accessory device, said driving sheave and at least two of said driven sheaves

each having a plurality of annular circumferential grooves therein, at least another of said driven sheaves having a cylindrical surface free of said grooves, and all of said driven sheaves being disposed in a common plane with said driving sheave; and,

an endless power transmission belt disposed about said sheaves and defining a serpentine path in said common plane, said belt having a flat driving portion and an oppositely arranged driving portion provided with a plurality of spaced longitudinal projections, said flat driving portion operatively engaging said cylindrical surface of said



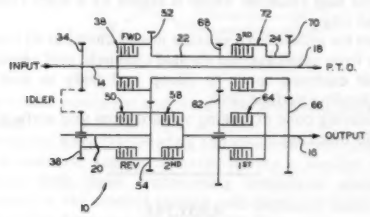
other driven sheave through a substantial arc of at least about 180°, and said projections of said oppositely arranged driving portion being received in said grooves of said grooved sheaves, said belt having a comparatively thin cross section for increasing belt life by reducing hysteresis, for reducing belt weight which reduces centrifugal tension loss, for allowing easy flexing around said sheaves, and for allowing backside bending enabling easy engagement of said flat driving portion against said cylindrical surface through said substantial arc to assure the driven sheave having said cylindrical surface is driven in a non-slipping manner.

4,031,762

MULTI-SPEED POWERSHIFT TRANSMISSIONS

James E. Shellberg, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed July 30, 1975, Ser. No. 600,254
Int. Cl.² F16H *3/08*, *37/06*
U.S. Cl. 74—15.63 **1 Claim**



1. In an in-line multi-speed constant-mesh-gear reversible powershift transmission of the type utilizing bidirectionally engageable multiple-disc fluid-pressure-actuated clutches, comprising in combination: an input shaft; a first gear fixed to said input shaft; a first shaft; a second gear journalled for rotation on said first shaft and drivingly connected with said first gear so as to rotate in the same direction therewith; a second shaft axially aligned with said input shaft; first clutch means for connecting said input shaft with said second shaft; second clutch means for connecting said second gear to said first shaft for conjoint rotation therewith; a third gear fixed to said second shaft; a fourth gear fixed to said first shaft and in mesh with said third gear; a third shaft axially aligned with said first shaft; third clutch means for connecting said third shaft with said first shaft; a fifth gear journalled for rotation on said third shaft; fourth clutch means for connecting said fifth gear to said third shaft; a sixth gear fixed to said third shaft, said fifth gear being located intermediate said third clutch means and said sixth gear; an output shaft axially aligned with said input shaft; a seventh gear fixed to said output shaft and in mesh with said sixth gear; an eighth gear fixed to said second shaft and in mesh with said fifth gear and fifth clutch means for connecting said second shaft to said output shaft for conjoint rotation therewith; a method for both modifying said in-line transmission to a transmission having a vertically offset output shaft, with respect to said input shaft, and adding an accessory drive shaft coaxial with said input shaft, said method comprising:

a. exchanging said third shaft for an output shaft that is vertically displaced relative to said input shaft;

b. exchanging said output shaft that is axially aligned with said input shaft for a first sleeve shaft concentric with said input shaft;

c. exchanging said second shaft for a second sleeve shaft, said second sleeve shaft being axially aligned with said first sleeve shaft; and

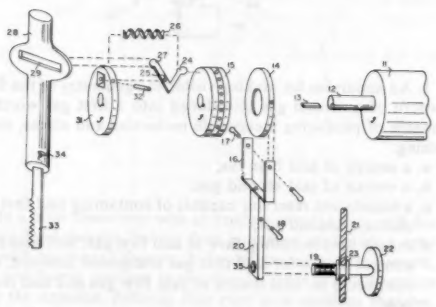
d. adding an accessory drive shaft, said accessory drive shaft being axially aligned with and operatively connected with said input shaft for conjoint rotation therewith and coaxial with said first and second sleeve shafts, whereby exchanging said third shift, said axially aligned output shaft and said second shaft, as well as adding said accessory drive shaft, produces a transmission having a vertically offset output shaft with respect to said input shaft and permits the coaxial interposition of said accessory drive shaft through said first and second sleeve shafts.

4,031,763

ADJUSTABLE STROKE LENGTH, RECIPROCATING TOOLS

Robert M. Eisenberg, Woodbine, Md., assignor to The Singer Company, Binghamton, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,631
Int. Cl.² F16H *21/18*
U.S. Cl. 74—50 **3 Claims**



1. In a reciprocating power tool, mechanism for modifying the length of the stroke of the tool, said mechanism comprising:

a. a housing;

b. a power source having a rotating shaft, said source being mounted in said housing;

c. means for converting the rotating motion of said shaft to reciprocating motion, said means comprising at least a lever member having an offset from said rotating shaft and a part mounted in said housing for reciprocal movement and driven by said member; and

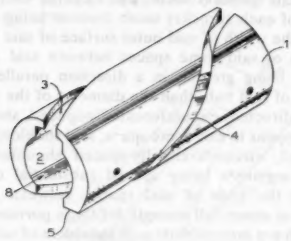
d. means for changing the distance of said offset from the center line of said shaft, said changing means comprising a first pressure device slidably supported on said shaft and longitudinally movable along said shaft to bear against one end of said lever member whereby the position of the other end of said lever member is modified.

4,031,764

DEVICES FOR ROTATING ARTICLES

Sidney Curtis, Cottingham, England, assignor to Thomas Hill Engineering Co. (Hull) Ltd., Hull, England

Filed Jan. 26, 1976, Ser. No. 652,531
Int. Cl.[2] F16H 25/12
U.S. Cl. 74—57 8 Claims



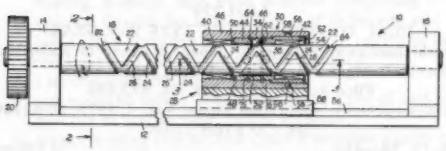
1. A longitudinal device of a predetermined length for rotating a plurality of articles, wherein each of the articles has base and top portions, respectively, said device being formed with two separate half-portions held together by a substantially cylindrical yoke, said device a substantially cylindrical longitudinal passage having an internal surface, two helical paths being defined in said device along said internal surface, said helical paths being located on said internal surface diametrically opposite one another along the entire length of said device, the width of one of said paths being substantially equal to the width of said base portion, and the width of the other of said paths being substantially equal to the width of said top portion.

4,031,765

REVERSING NUT FOR DIAMOND THREAD SCREW

Joseph R. Metz, Georgetown, Conn., assignor to Norco, Inc., Ridgefield, Conn.

Filed Mar. 31, 1975, Ser. No. 563,793
Int. Cl.[3] F16H 25/12
U.S. Cl. 74—57 20 Claims



1. A reversing nut for use with a diamond thread screw having threads defining criss-crossed grooves, comprising in combination:

a. a nut body having a through opening to receive the screw,

b. a ball engaging a wall of one groove of the screw,

c. means mounting the ball against lateral movement thereof on the body, said ball extending into the body opening for said groove wall engagement,

d. a laterally movable ball carried by the body, said ball extending into the opening thereof for engagement with a wall of a groove of the screw,

e. means providing a slot in the body in which the movable ball is disposed, for enabling said movable ball to be translationally shifted in directions along the body axis whereby, while guided and directly engaged by the slot walls it can transfer from direct engagement with one groove wall of the screw and simultaneous direct engagement with one slot end, to direct engagement with another groove wall of the screw and simultaneous direct engagement with the other slot end, thereby to effect a change in the axial direction of travel of the nut with respect to the screw, and

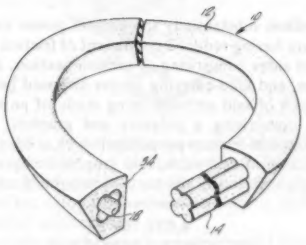
f. springs for directly engaging the movable ball to yieldably hold it against either one slot end or else the other slot end.

4,031,766

ADJUSTABLE ENDLESS BELT OF UNITARY CONSTRUCTION

Paul Beck, 1100 N. Alta Loma, Los Angeles, Calif. 90069

Filed Apr. 2, 1976, Ser. No. 673,200
Int. Cl.[2] F16G 1/00
U.S. Cl. 74—231 J 11 Claims



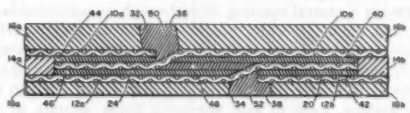
1. A continuously adjustable endless belt of unitary construction for use in power transmission comprising a length of flexible tear-resistant material, one end thereof being of reduced diameter and defining an extended male end portion, the other end of said length having a longitudinal channel therein adapted to receive said male portion, said channel and said male portion being of equal lengths such that upon disposing said male portion within said channel a continuous endless solid belt is defined.

4,031,767

SPLICED BELTING

Nathan E. Guyer, Stoneham, Mass., assignor to American Biltrite Inc., Cambridge, Mass.

Filed Jan. 23, 1976, Ser. No. 651,859
Int. Cl.[2] F16G 1/00, 5/00; B65G 15/30
U.S. Cl. 74—231 J 10 Claims



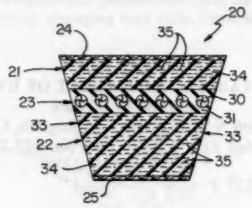
5. In conveyor belting comprising at least two carcass plies, an elastomeric ply intermediate said carcass plies, and outer plies of rubbery compound; a spliced area in which all carcass plies are severed, the severed locations being spaced apart longitudinally of the belting, terminal portions of each carcass ply overlapping each other, overlapping carcass ply surfaces being coated with tie gum.

4,031,768

ENDLESS POWER TRANSMISSION BELT STRUCTURE

Dewey D. Henderson; Jerry W. Rogers, and Gerald C. Hollaway, Jr., all of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Filed June 18, 1976, Ser. No. 697,801
Int. Cl.² F16G 5/00, 5/16
U.S. Cl. 74—233 7 Claims



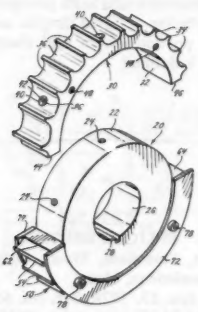
1. An endless substantially trapezoidal power transmission belt structure having reduced coefficient of friction raw-edged non-parallel sides comprising, a tension section, a compression section, and load-carrying means disposed between said sections, each of said sections being made of an elastomeric compound comprising a polymer and graphite, said compound having anti-friction properties which reduce the coefficient of friction of said sides, said graphie comprising 15–90 parts by weight for each 100 parts by weight of said polymer.

4,031,769

SEGMENTED SPROCKET

Milton O. Kassing, St. Louis, Mo., assignor to Semmelmeyer-Corby Co., St. Louis, Mo.

Filed Feb. 6, 1976, Ser. No. 656,193
Int. Cl.² F16H 55/12
U.S. Cl. 74—243 DR 2 Claims



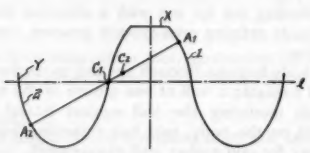
1. A sprocket for tabletop chain which comprises a hub plus a plurality of segments that intimately encircle said hub, said hub having a central opening therethrough to accommodate a shaft and having a wide, machined, convex, outer surface thereon and having a plurality of radially-directed, circumferentially-spaced, threaded sockets therein which are spaced outwardly from said central opening and which open to said outer surface, each of said segments being arcuate in side elevation and having a wide, machined, concave, inner surface thereon and having a plurality of sprocket teeth at the outer periphery thereof and having a plurality of radially-directed, circumferentially-spaced, shouldered passages extending all the way therethrough, said sprocket teeth and the portions of said segments which are intermediate the roots of said sprocket teeth defining spaces between adjacent sprocket teeth, said radially-directed, circumferentially-spaced shouldered passages in said segments being formed so they are permanently in register with some of said spaces between adjacent sprocket teeth, said some of said spaces between adjacent sprocket teeth and said radially-directed, circumferentially-spaced shouldered passages in said segments being disposed in register with said radially-directed, circumferentially-spaced threaded sockets in said hub, the shoulders of said radially-directed, circumferentially-spaced shouldered passages in said segments opening to said some of said spaces between adjacent sprocket teeth, the width of each of said segments and of each sprocket tooth thereon being substantially equal to the width of said outer surface of said hub, the length of each of said some spaces between said adjacent sprocket teeth being greater, in a direction parallel to the geometric axis of said hub, than the diameter of the shoulder of the radially-directed, circumferentially-spaced, shouldered passage which opens to said some space, said shoulders of said radially-directed, circumferentially-spaced shouldered passages in said segments being spaced substantial distances inwardly from the ends of said spaces between adjacent sprocket teeth to assure full strength for those portions of said segments which are intermediate said shoulders of said radially-directed, circumferentially-spaced shouldered passages in said segments and said ends of said some spaces between adjacent sprocket teeth, the width of each of said segments being at least as great as the pitch of said sprocket teeth, and fasteners, which have the heads thereof telescoped into said shoulders of said radially-directed, circumferentially-spaced shouldered passages in said some spaces between said sprocket teeth to be clear of all parts of said tabletop chain and which have the shanks thereof telescoped into said radially-directed, circumferentially-spaced, threaded sockets in said hub.

4,031,770

DUAL TOOTH CONTACT TYPE W-N GEAR

Shoichi Ishikawa, Yokohama, Japan, assignor to Kabushiki Kaisha Hasegawa Haguruma, Tokyo, Japan

Filed Apr. 5, 1976, Ser. No. 673,896
Claims priority, application Japan, Apr. 7, 1975, 50-41200
Int. Cl.² F16H 55/06
U.S. Cl. 74—462 2 Claims



1. A dual tooth contact type W-N gearing including a pair of helical gears of which the basic rack tooth profile, as taken in a transverse or normal-to-teeth reference plane, is composed of addendum convex circular arcs and dedendum concave circular arcs, characterized in that the basic rack tooth profile is so defined that the addendum convex circular arc on one side of a tooth and the dedendum concave circular arc on the same side of another tooth neighboring said tooth on the other side thereof have both a point of meshing contact set on the circular arc so as to have at the respective points of meshing contact lines of radius lying on one and the same straight line.

4,031,771
VEHICLE REAR-VIEW MOUNTING ARRANGEMENT

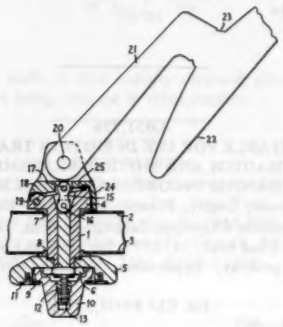
Daniel Daly, Chertsey; Kenneth Paul Davis, Harlington, and Charles Arthur Boughtflower, Bourne End, all of England, assignors to Magnatex Limited, Heathrow, England

Filed Oct. 28, 1975, Ser. No. 626,124

Claims priority, application United Kingdom, Nov. 4, 1974, 47698/74

Int. Cl.² F16D *11/00*; A47G *1/24*

U.S. Cl. 74—479 6 Claims



1. A mounting arrangement for mounting a vehicle rear-view mirror on the outside of a part of a vehicle body, comprising:

a. a tubular bearing member adapted to be mounted to extend through and be turnable in the body part and having an outer and an inner end and defining a passage extending therethrough,

b. a mirror support member,

c. hinge means having an axis extending transversely to the axis of said bearing member and connecting said mirror support member to the outer end of said bearing member for hinging about the axis of the hinge means,

d. a first rotatable control member connected to the inner end of the bearing member, for turning the bearing member about its axis,

e. a push member axially movable in the passage in said bearing member, said push member comprising a rod which is flexible for at least a part of its length, said rod being screw-threaded at its inner end and having its outer end rigid with the mirror support member,

f. a second rotatable control member,

g. screw-thread means coupling the inner end of said push member to said second control member,

h. means holding said second control member axially captive with the inner end of said bearing member, and

i. means operative in response to axial movement of said push member to cause the mirror support member to hinge about said hinge means.

4,031,772
NIGHT/DAY REARSIDE VIEW MIRROR

Glenn DeCastri, 32 Circle Drive, Glen Cove, N.Y. 11542

Filed June 22, 1976, Ser. No. 698,706

Int. Cl.² F16C *1/10*

U.S. Cl. 74—501 M 8 Claims

1. A rear vision mirror assembly for use on a vehicle, comprising:

A. a housing open at one end,

B. a vertically disposed mirror including a pair of mirror panels angularly positioned relative to each other and having reflective faces of different values of intensity,

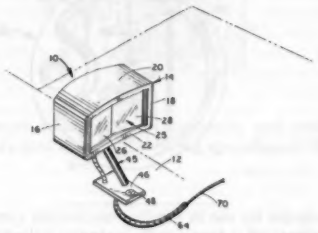
C. means for rotatably supporting said mirror with said mirror panels facing the open end of said housing for rotation about an upright axis between a first position in which one of said mirror panels is brought into reflective position for use to a second position in which the other of said mirror panels is brought into reflective position for use, said supporting means including:

i. a pivot member extending vertically in said housing, and

ii. a first arm secured to said mirror at one end thereof and rotatably mounted relative to said pivot member at the opposite end thereof,

D. stop means mounted within said housing to limit the path of travel of said mirror between the first and second positions,

E. means for mounting said housing in fixed position relative to the vehicle associated therewith, and



F. means for controlling the movement of said mirror between said first and second positions from within the vehicle, said controlling means includes,

i. a bracket extending between said mirror and said pivot member adjacent said arm,

ii. a flexible tubular sheath secured to said bracket at one end thereof and having its opposite end extending within the vehicle, and

iii. a flexible cable positioned within said sheath and secured at one end thereof to said arm between said mirror and said pivot member, and having its opposite end terminating within the vehicle, such that linear movement of said cable within said sheath applies a force to effect angular displacement of said arm for movement between said first and second positions.

4,031,773
DEVICE FOR ACTUATING A SHEATHED CONTROL CABLE

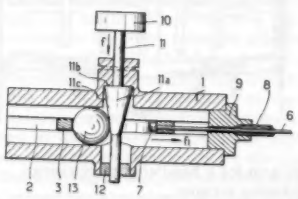
Robert René Marechal, Paris, France, assignor to SICMA Societe Industrielle et Commerciale de Materiel Aeronautique, Issoudun, France

Filed July 14, 1976, Ser. No. 705,108

Claims priority, application France, Feb. 13, 1976, 76.04672

Int. Cl.² F16C *1/22*

U.S. Cl. 74—501.5 R 8 Claims



1. A device for actuating a sheathed control cable, said device comprising a casing, push button means actuable to exert a tension on the cable, said push button means being slidable in the casing, means defining an inclined surface rigid with the push button means, a traction member slidably mounted in the casing, the cable being fixed to the traction

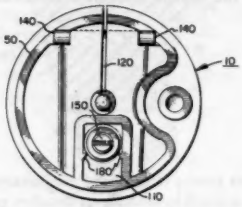
member, and ball means interposed between the inclined surface and the traction member.

4,031,774

MOLDED MEMBER FOR USE IN WINDING MECHANISMS

Robert A. Bennett, Easton, Conn., assignor to Waterbury Lock & Specialty Company

Filed Mar. 19, 1976, Ser. No. 668,459
Int. Cl.² G05G *1/00*
U.S. Cl. 74—547 **4 Claims**



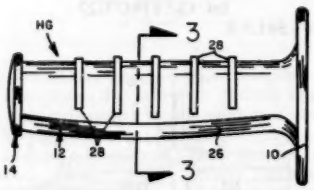
1. A device for use in winding mechanism comprising:
a member with a downwardly extending cylindrical wall and a top with a circular periphery, the top having an elongated channel with a flat bottom extending along one of its diameters and dividing it into two like raised portions, each of these portions having a bore extending from the periphery of the top to the edge of the channel with the axes of the top being horizontally coincident and perpendicular to the axis of the channel and being located above its bottom and near one of its ends, the member further having a central vertical slit extending downwardly through the top and the wall along an imaginary line which begins at a point along the bottom of the wall, then runs vertically upwardly along the wall to a point of intersecion of the end of the channel axis adjacent the bores and the periphery of the top, and then runs along the channel axis between the bores and through the center of the top to terminate at a point between the center of the top and the end of the channel axis remote from the bores.

4,031,775

HAND GRIP

Preston L. Petty, 403 N. Main, Newberg, Oreg. 97132

Filed Feb. 9, 1976, Ser. No. 656,729
Int. Cl.² B62K *21/26*
U.S. Cl. 74—551.9 **5 Claims**



1. A hand grip for a handlebar comprising:
a hand-gripping section;
means at each end of said hand-gripping section to maintain an operator's hand in position on said hand-gripping section;
said hand-gripping section having a finger-engaging area and a palm-engaging area, said finger-engaging area defining a plurality of flat surfaces therealong which are disposed substantially parallel with respect to a longitudinal axis of said hand grip and said flat surfaces are joined thereby defining a slightly curved linear ridge the length of said hand gripping section so that said plurality of flat surfaces and ridge define in cross-section at least a V-shape configuration conforming to the jointed formation of finger joints of an operator's hand when engaging said hand-gripping section, said palm-engaging area defining a semi-circular surface having rib means disposed therealong at spaced intervals conforming to the palm area of the operator's hand when engaging said palm-engaging area and being truncated at their ends short of said flat surfaces

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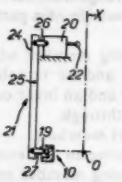
4,031,776

CAMS SUITABLE FOR USE IN MOTION TRANSMITTING MECHANISM AND MOTION TRANSMITTING MECHANISM INCORPORATING SUCH CAMS

William Lenne, Gagny, France, assignor to Essilor International Generale d'Optique, Joinville-le-Pont, France

Filed Mar. 31, 1975, Ser. No. 563,659
Claims priority, application France, Apr. 11, 1974, 74.12725
Int. Cl.² F16H *53/00*
U.S. Cl. 74—567 **8 Claims**



1. A motion transmitting mechanism comprising a cam assembly comprising a fixed base, a rigid one-piece cam member having a generally J-shaped cam surface including a part circular portion and a planar portion tangent to and continuous with said part circular portion, and means adjustably mounting said cam member on said base for angular displacement about the axis of the said part circular portion, a feeler, means for maintaining said feeler in contact with said cam surface, a work block mounted for translatory movement perpendicular to said cam surface, and motion transmitting means connecting said work block to said feeler for transmitting movement, said motion transmitting means transforming movements of said feeler away from said axis of the part-circular cam surface into movements of the work block toward said axis, and vice versa.

4,031,777

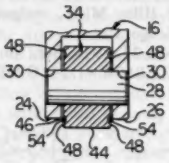
LOW STRESS CAM ROLLER

John H. Parks, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 11, 1976, Ser. No. 657,127
Int. Cl.² F16H *53/06*
U.S. Cl. 74—569 **4 Claims**

1. In a cam follower mechanism, a rotary cam having a straight follower lifting cam surface, a reciprocally guided follower, a follower roller rotatably supported by said follower for engagement with same cam surface, said roller being a generally cylindrical member having a peripheral contact surface and a pair of opposite, radially directed sidewalls,

wherein the improvement comprises means on said roller for relieving stress, said means on said roller comprising an annular groove in each of said radially directed sidewalls, said annular groove being arcuate in cross-section.

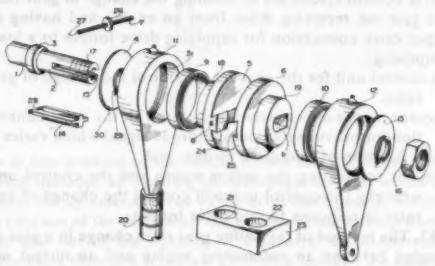


4,031,778

DRIVE SYSTEM

David Stephen Fazekas, Oakville, Canada, assignor to The International Nickel Company, Inc., New York, N.Y.

Filed July 11, 1975, Ser. No. 595,300
Claims priority, application Canada, Aug. 28, 1974, 208027
Int. Cl.[2] G05G 5/04; F15B 15/24
U.S. Cl. 74—571 L 4 Claims



1. A double-eccentric variable drive system comprising a drive shaft, two eccentrics mounted on said drive shaft to be driven thereby, and means for varying the eccentricity of both of said eccentrics simultaneously, said means comprising a spindle having left-hand screw-threads on one end thereof and right-hand screw-threads on the other end thereof, said spindle having an enlarged central portion rotatably mounted in said shaft but radially fixed relative thereto, said eccentrics each having an annular surface carrying a bearing which in turn carries a connecting rod and said eccentrics each having a radial bore therethrough tapped to correspond with and receive the threads of said spindle, said bores being aligned on opposite sides of said shaft, each eccentric having an axial bore larger than the diameter of the shaft at least in a direction parallel to said spindle to allow for sliding movement of the eccentrics with respect to each other radially of the shaft, means for rotating said spindle in one direction to simultaneously increase the eccentricity of both of said eccentrics relative to said shaft and for rotating said spindle in the other direction to simultaneously decrease the eccentricity of both of said eccentrics relative to said shaft.

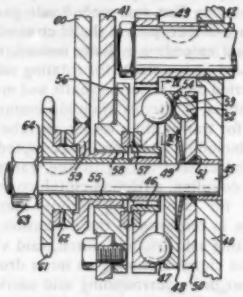
4,031,779

ROTARY DRIVES

Rudi Helmut Braune, Griffin Hill, Thrupp, Stroud, Gloucestershire, England

Filed Oct. 16, 1975, Ser. No. 623,093
Int. Cl.[2] F16H 35/04
U.S. Cl. 74—650 20 Claims

1. A mechanical rotary coupling comprising a driving member, a driven member coaxial therewith, a contact member having a bearing surface abutting opposing faces of said driving and driven members, said members being connected together by said contact member, means for applying variable axial thrust between said driving and driven members so as to vary the torque transmitted therebetween, and means arranged to vary said axial thrust during operation of the coupling.

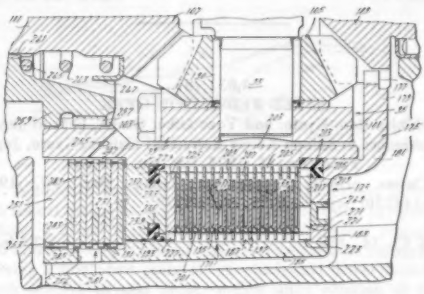


4,031,780

COUPLING APPARATUS FOR FULL TIME FOUR WHEEL DRIVE

Courtney F. Dolan, Syracuse, and Thurman O. Ruettinger, Skaneateles, both of, NY, assignors to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 29, 1974, Ser. No. 528,244
Int. Cl.[2] F16H 1/44; F16D 43/00, 31/00
U.S. Cl. 74—711 6 Claims



1. Coupling apparatus for power drive systems comprising first and second rotatable elements adapted to be coupled together, a first coupling device comprising a viscous coupling chamber, a first set of viscous coupling members in said chamber drivingly connected to one rotatable element, and a second set of viscous coupling members in said chamber, interleaved with said first set of viscous coupling members and drivingly connected to the other rotatable element, viscous fluid in said chamber adapted to be sheared when said members are rotated relative to one another, said fluid transmitting torque from one set of coupling members to the other and increasing in temperature as a result of shearing action, said fluid expanding as its temperature increases, and a second coupling device adapted to be actuated by the expansion of fluid in said first coupling device, said second coupling device comprising a second chamber closed at one end, a first set of friction coupling members in said second chamber drivingly connected to one rotatable element, a second set of friction coupling members in said second chamber drivingly connected to the other rotatable element, and a piston at the other end of said second chamber and adjacent said viscous coupling chamber, said viscous fluid applying pressure on said piston to move the same toward and apply pressure on said

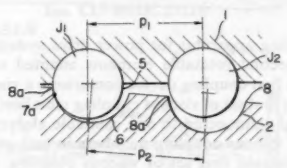
friction coupling members in response to the expansion of said viscous fluid in said viscous coupling chamber.

4. Coupling apparatus for power drive systems comprising a differential including first and second side gear members, an annular carrier member, pinion shafts connected to said carrier member and extending radially inward, means drivingly connected to said pinion shafts for rotating said carrier member pinions carried on said pinion shafts and meshing with said side gear members, a viscous coupling connected to two of said members for transmitting torque therebetween, said viscous coupling including a viscous fluid adapted to increase the temperature and expand during torque transmission thereby in said viscous coupling, a friction clutch connected to two of said members for transmitting torque therebetween, and means movable in response to the expansion of said viscous fluid for actuating said friction clutch, said viscous coupling and said friction clutch including an inner drum and an outer drum, said inner drum surrounding said carrier member and connected to one of said members, said outer drum surrounding said inner drum and having a diameter greater than the diameter of said inner drum to provide space therebetween, a plurality of first viscous coupling plates drivingly connected to one of said drums and located in said space, a plurality of second viscous coupling plates interleaved with said first viscous coupling plates and drivingly connected to the other drum, said viscous fluid being located between said viscous coupling plates, a first set of friction clutch plates drivingly connected to said one drum and a second set of friction clutch plates interleaved with said first set of friction clutch plates and drivingly connected to said other drum, said means for actuating said friction clutch comprising a piston in said space, said piston being adapted to apply pressure on said friction clutch plates in response to pressure applied thereto by said expanding viscous fluid.

4,031,781
SPEED REDUCTION GEAR

Yoshihisa Iida, Kyoto, and Yozo Oike, Osaka, both of Japan, assignors to Shinpo Kogyo Kabushiki Kaisha, Kyoto, Japan

Filed Dec. 15, 1975, Ser. No. 640,944
Claims priority, application Japan, Dec. 16, 1974, 49-144220; Sept. 9, 1975, 50-109329
Int. Cl.² F16H *1/06, 1/20, 1/28*
U.S. Cl. 74—804 **2 Claims**



1. A speed reduction gear wherein a stationary internal gear and an external gear meshing with the internal gear are provided, and wherein a differential rotation due to difference in the number of teeth between the above said gears is transmitted to an output shaft characterized in that:

A. the teeth of the internal gear are provided with a circular convex profile, and the teeth of the external gear are provided with a circular concave profile the radius of which is larger than that of the above said circular convex profile, in that:

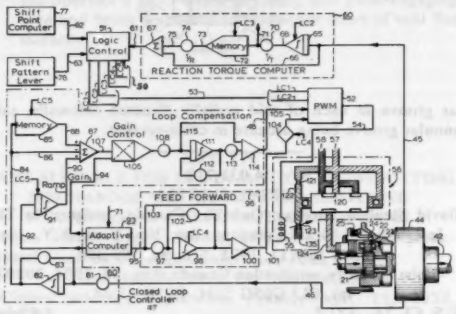
B. the meshing of the above said gears moves reciprocally between two points on the concave profile, and in that:

C. the range defined by the above said two points does not include any edge of the concave profile.

4,031,782
METHOD AND APPARATUS FOR A TRANSMISSION CONTROL SYSTEM

Alan Leonard Miller, Mount Prospect, Ill., and John Saxon Ivey, Bloomfield Hills, Mich., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Feb. 27, 1976, Ser. No. 661,896
Int. Cl.² B60K *41/18*; G05G *21/00*
U.S. Cl. 74—866 **18 Claims**



1. A control system for controlling the change of gear ratio in a gear set receiving drive from an engine and having an output drive connection for supplying drive torque to a load, comprising:

a control unit for the gear set to control the change of gear ratio;

sensor means operatively associated with the drive connection for providing an output torque signal which varies as a function of said drive torque; and

means connecting the sensor means and the control unit, whereby the control unit will control the change of gear ratio in response to said drive torque.

17. The method of regulating gear ratio change in a gear set coupled between an automotive engine and an output mechanical drive connection, comprising the steps of:

sensing the output torque provided by the gear set;

providing a feedback signal which varies as a function of the output torque;

establishing a reference signal;

continually comparing the feedback signal with the reference signal to determine the proper time for effecting the gear ratio change; and

modifying the control of the gear ratio change as a function of changes in the feedback signal indicating the output torque.

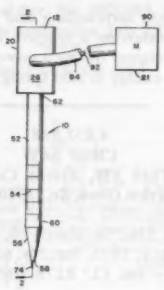
4,031,783
TATTOO ETCHING MACHINE

Stanley C. Paul, and Shelby J. Russell, both of 9912 Woodside, Detroit, Mich. 48204

Filed Apr. 7, 1975, Ser. No. 565,342
Int. Cl.² B26F *1/24*
U.S. Cl. 81—9.22 **1 Claim**

1. A tattoo etching machine comprising a U-shaped body member having a top leg portion and a bottom leg portion, each connected at one end to a connecting portion, which body member has a threaded opening in the connecting portion extending in the direction of the leg portions, a non-threaded opening in the bottom leg portion extending transversely of the leg portions and in the direction of the connecting portion, and a threaded opening extending from the free end of the bottom leg portion in the direction of the bottom leg portion into the non-threaded opening therethrough, an externally threaded bearing member positioned within the threaded opening in the connecting portion of the body member having a cylindrical opening extending axially thereof, a drive shaft having a head on one end thereof extending through the opening in the bearing member for rotation therein, means for connecting a drive cable to the one end of

the drive shaft exteriorly of the body member, a hollow cylinder having a radially extending threaded opening extending transversely therethrough sleeved over the other end of the drive shaft within the body member between the leg portions thereof for rotation with the drive shaft, a set screw extending through the radial opening in the hollow cylinder rigidly securing the cylinder to the drive shaft, a pin extending axially of the drive shaft from the hollow cylindrical member and offset from the axis of rotation of the hollow cylindrical member and the drive shaft, a hollow cylindrical barrel one end of which extends through the unthreaded opening in the bottom leg portion of the body member transversely of the bottom leg portion and in the direction of the connecting portion of the body member, a barrel tip secured to the other end of the barrel having an opening therethrough extending axially of the barrel, needle means extending through the barrel, one end of which is adapted to extend through the opening in the barrel



tip in one position of the needle means and the other end of which includes an opening therethrough through which the pin on the cylinder secured to the drive shaft passes, whereby on rotation of the drive shaft the needle means is reciprocated into and out of the opening in the barrel tip a controlled distance, a threaded set screw extending through the opening in the bottom leg portion of the body member and into contact with the one end of the barrel for securing the barrel to the body member in axially adjusted positions of the barrel with respect to the body member, and a cover for the body member enclosing the area between the top and bottom leg portions of the body member, which cover is a U-shaped member constructed of resilient material having a connecting portion and a pair of leg portions, which leg portions converge slightly toward each other with the cover not assembled on the body portion, whereby on assembly of the cover with the body portion the leg portions are spread apart and the resiliency of the cover material holds the cover on the body member.

4,031,784

DEVICE FOR UNLOCKING FROZEN VALVES

George H. Cobbe, Jr., 3411 S. Camino Seco No. 46, Tucson, Ariz. 85730

Filed Mar. 8, 1976, Ser. No. 664,899

Int. Cl.² B25B *13/04, 13/50*

U.S. Cl. 81—57.39 **10 Claims**

1. A tool for freeing locked and frozen valves which applies only torque forces about the longitudinal axis of the valve intermediate the valve stem and the valve body, said tool comprising in combination:

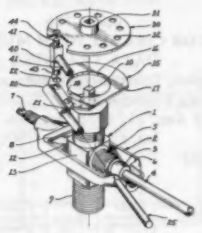
a. a first apertured collar for circumscribingly engaging the valve body, said collar including restraining means for inhibiting rotation of said first collar about the longitudinal axis of the valve body;

b. a first lever extending generally tangentially from said first collar;

c. an aperture disposed in said first collar in proximity to the point of attachment of said first lever;

d. a second collar for non-rotatably engaging the valve stem, said second collar including a plurality of apertures spaced about the periphery of said second collar; and

e. a second lever positionable in general vertical alignment with said first lever for inducing relative rotational movement between said first and said second collars, said second lever including a first stud for engaging said aperture within said first collar and a second stud for engaging



one of said plurality of apertures within said second collar;

whereby, on urging angular displacement of said second lever toward said first lever, said first and second studs generate only a torque force acting through said first and second collars upon the valve body and valve stem, respectively, to unlock and unfreeze the valve stem.

4,031,785

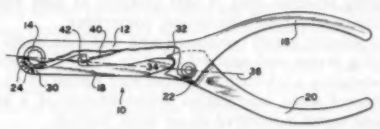
SQUEEZE ACTUATED WRENCH

Charles J. Wheeler, 2346 Haines, Madison, Ohio 44057

Filed Sept. 2, 1975, Ser. No. 609,399

Int. Cl.² B25B *13/46*

U.S. Cl. 81—57.39 **13 Claims**



1. A squeeze actuated ratchet wrench comprising a rotatable socket means having an annular toothed outer peripheral surface, a driver member having one end thereof engaging with said toothed peripheral surface of said socket means and defining a first pivot point about which said driver member pivots relative to said socket means upon rotation of said socket means by said driver member and an opposite end, a body for supporting said socket means at one end portion thereof for rotation about an axis of rotation and having a handle portion at the opposite end thereof, an actuating handle having one end thereof adapted to be gripped by the user's hand and the other end thereof engaging with said opposite end of said driver member and defining a second pivot point about which said actuating handle and said driver member rotate relative to each other upon rotation of said socket means, said actuating handle being pivotably connected intermediate said end portions of said actuating handle to said body at a third pivot point for rotation relative to said body, said third pivot point and the axis of rotation of said socket means defining a path through which a longitudinal axis of the wrench passes with said first pivot point being located on one side of said longitudinal axis and said second pivot point being located on the opposite side of said longitudinal axis, said actuating handle and said handle portion of said body being adapted to be simultaneously gripped by the hand of the user and squeezed to rotate said one end of said actuating handle toward said body to rock and move said driver toward said socket means and effect rotation of said socket means and wherein the distance between said third pivot point and said

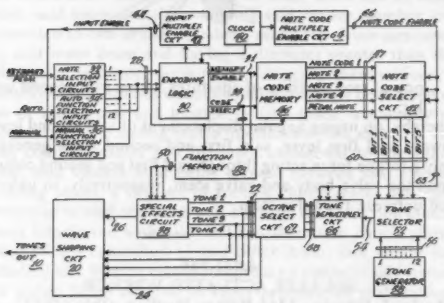
second pivot point decreases upon movement of said one end of said actuating handle toward said body to increase the force transferable between said actuating handle and said driver member by increasing the mechanical advantage of the lever arrangement defined by said actuating handle and said driver member.

4,031,786

TONE SELECTOR CIRCUIT WITH MULTIPLEXED TONE DATA TRANSFER

Howard B. Kaplan, Lynnwood, Wash., assignor to Warwick Electronics Inc., Chicago, Ill.

Filed Aug. 11, 1975, Ser. No. 603,860
Int. Cl.² G10F 1/00
U.S. Cl. 84—1.03 **19 Claims**



1. In a musical instrument having means for generating tone signals and means for providing information representative of a plurality of selected ones of said tone signals, a circuit for producing selected ones of said plurality of tone signals in accordance with said information, comprising:

tone selector means connected with said tone signal generating means and said information providing means for producing a selected one of the tone signals on an output thereof when information representative of a selected tone signal is received on an input thereof;

multiplexing means connected with said information providing means for transferring the information provided thereby to an input of the tone selector means on a time division multiplexing basis, said tone selector selectively producing time division multiplexed tone signals on an output thereof in accordance with said information; and

means connected with the output of the tone selector means for demultiplexing the selected multiplexed tone signals.

4,031,787

PUNCH AND STRIPPER ASSEMBLY

Percy Luther Cady, Darien Center, N.Y., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed July 28, 1976, Ser. No. 709,338
Int. Cl.² B26F 1/14
U.S. Cl. 83—140 **10 Claims**

1. A punch and stripper assembly for use with a die on a workpiece beneath the ram of a punch press, comprising:

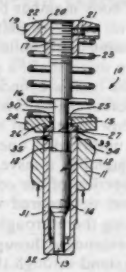
a. a punch having means at one end thereof for coacting with said die, an intermediate body portion, a shoulder facing away from said one end, and a threaded end portion at the opposite end;

b. an enlarged head adjustably carried on said threaded end portion for being engaged by the ram;

c. a compression spring surrounding said opposite end of said punch, and at one end engaging said head;

d. a washer surrounding said punch and engaging the opposite end of said spring;

e. a retainer acting between said punch shoulder and said washer, and held in engagement therewith by said spring; and



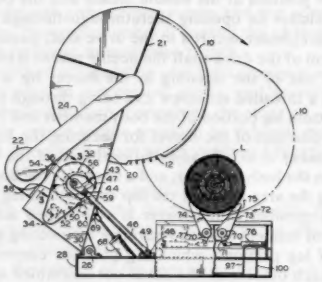
f. a stripper sleeve surrounding said body portion of said punch for transferring a reactive force from the workpiece to said retainer during a power stroke of the punch press to store energy in said spring.

4,031,788

CHOP SAW

Dallas F. Boge, 7145 SW. Sylvan Court, Portland, Oreg. 97225, and Roderick Olsen, Jr., 13500 SW. Hazel, Beaverton, Oreg. 97005

Division of Ser. No. 556,796, March 10, 1975. This application Oct. 1, 1975, Ser. No. 618,699
Int. Cl.² B27B 7/00
U.S. Cl. 83—380 **10 Claims**



1. A chop saw comprising:

a powered saw blade,

a saw carriage means supporting said saw blade and mounted for moving said blade toward and away from a workpiece,

carriage drive means for moving said carriage means to feed said saw blade toward and away from and in a cutting stroke through said workpiece,

and position-responsive speed control means responsive to the position of said carriage means with respect to said workpiece for reducing the feed speed of said carriage means during the cutting stroke of said saw blade,

a pair of clamping arm means for gripping opposite sides of a generally cylindrical workpiece during the cutting stroke of said saw blade, a pair of separate and independent hydraulic motors, one for operating each said clamping arm means, each said hydraulic motor being in a separate hydraulic control circuit, each said control circuit including a three-position control valve having a first spring-centered flow-blocking position, a second position for directing flow to said hydraulic motor in a direction to apply said clamp arm means and a third position for directing flow to said hydraulic motor in a direction to

release said clamp arm means, and valve-operating means operable sequentially first during movement of said saw blade toward a workpiece to shift said control valve from said first position to said second position to apply said clamping arm means to the workpiece prior to commencement of said cutting stroke, second to shift said control valve from said second position back to said first position to block flow and thereby lock said clamp arm means on the workpiece during said cutting stroke and third to shift said control valve from said first position to said third position to release said workpiece after completion of said cutting stroke.

4,031,789

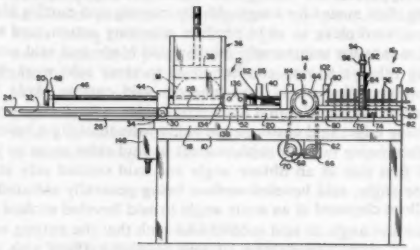
MEAT CUBING MACHINE

Arnold Soodalter, University Park Apts., Apt. M-1, Easthampton Road, Holyoke, Mass. 01040

Continuation-in-part of Ser. No. 602,269, Aug. 6, 1975, Pat. No. 3,990,336. This application July 29, 1976, Ser. No. 709,940

Int. Cl.² B26D *3/18*

U.S. Cl. 83—404.2 **5 Claims**



1. Apparatus for cubing frozen meat comprising, first cutting means for cutting a slab from a piece of meat, second cutting means for cutting the slab longitudinally into strips, and third cutting means for cutting the strips transversely into cubes, wherein the first cutting means is a horizontally reciprocable cutting blade having a cutting edge comprised of a plurality of equi-spaced teeth alternately offset upwardly or downwardly relative to the plane of the cutting blade, and wherein the second and third cutting means each comprise a plurality of upright annular rotatable saw tooth cutting blades, the first and second cutting means being disposed in a horizontally disposed first meat channel, and the third cutting means being disposed in a horizontally disposed second meat channel normal to the first meat channel, a first meat ram slidable in the first meat channel, a second meat ram slidable in the second meat channel, a meat hopper linked to and slidable with the first meat ram, and a strip guide having a plurality of partitions in the second meat channel for guiding strips of meat, and handle means for effecting vertical movement of the strip guide for clearing the partitions from the second meat channel, whereby manual inward sliding movement of the first meat ram first causes a slab to be cut from meat within the hopper by the first cutting means with meat dust being reclaimed as the cutting blade of the first cutting means reciprocates, second causes the so-cut slab to be sliced into strips by the second cutting means, with meat dust produced as the so-sliced strips are cut by the second cutting means being reclaimed, and third causes the so-sliced strips to be moved into the second meat channel between the partitions of the strip guide for retaining the strips in alignment, with manual vertical upward movement of the strip guide moving the partitions out of the second meat channel whereby manual inward sliding movement of the second meat ram causes the aligned strips to be moved to the third cutting means for cubing, with meat dust produced as the strips are cubed by the third cutting means being reclaimed.

4,031,790

LUMBER TRIMMER

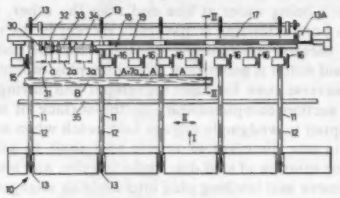
Bengt Arvidsson, Sibbhult, Sweden, assignor to A & B Constructors AB, Markaryd, Sweden

Filed Mar. 18, 1976, Ser. No. 667,953

Claims priority, application Sweden, Mar. 21, 1975, 7503286

Int. Cl.² B27B *5/02*

U.S. Cl. 83—425.4 **4 Claims**



1. Lumber trimmer, comprising a saw table having a lumber conveyor for moving lumber pieces in a first direction across the saw table with the lumber pieces oriented in a second direction perpendicular to the first direction; a first end cutting device on the saw table, including a cutter for cross-cutting one end of the lumber pieces at a first cutting position; a second end cutting device on the saw table, including a common cutter support displaceable in the second direction and a plurality of cutters selectively operable for cross-cutting the other end of the lumber pieces at a selected one of a plurality of second cutting positions spaced-apart in the second direction, the cutters of the second end cutting device being evenly spaced apart in the second direction on said support; and a power operated linear positioner for selectively positioning the cutter support at discrete positions spaced apart in said second direction, said positioner being connected between a stationary holder on said saw table and said cutter support and including first and second double-acting fluid pressure cylinders connected with one another in additive relation, the length of stroke of one of said cylinders being one unit of distance and the length of stroke of the other cylinder being two units of distance, and the spacing of adjacent cutters on said cutter support being a multiple of said unit of distance.

4,031,791

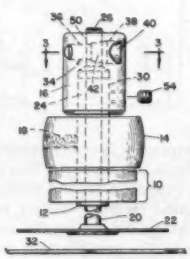
KNIFE MOUNTING UNIT FOR ROLL SLICING MACHINE

Dale S. Lecrone, 4447 Bonnymede, Jackson, Mich. 49201

Filed Sept. 16, 1976, Ser. No. 723,917

Int. Cl.² B26D *3/08, 4/76*

U.S. Cl. 83—508.2 **9 Claims**



1. A disc blade mounting and driving unit for a roll slicing machine comprising in combination, a normally vertical driving sleeve supported for rotation about the axis thereof within bearing means, a drive pulley fixed to the upper end of said sleeve, a knife shaft coaxial with said sleeve and extending respectively at the opposite ends thereof beyond the opposite

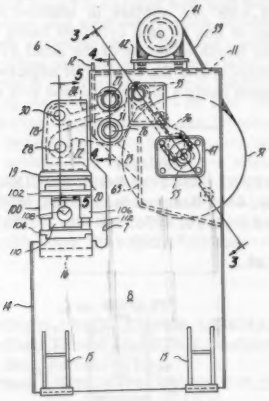
ends of said sleeve and a disc knife fixed to the lower end of said shaft; the improvement comprising a chuck unit comprising a head having a first bore in one end to receive the upper end of said driving sleeve coaxially, means to firmly secure said head to said upper end of said driving sleeve, the opposite end of said head having a second bore coaxial with said first bore and of a diameter complementary to that of said knife shaft and receiving the upper end of said shaft, said shaft having an arcuate notch in one side thereof adjacent the upper end and extending transversely to the axis of said shaft and said notch being wider at one end than the other, said head having a bore extending transversely thereof in the upper end portion thereof substantially coaxial with the axis around which said notch is generated, a latching plug mounted within said transverse bore for axial movement and having a frustoconical section complementary to the surface of said notch and adapted to wedgingly engage said notch when said plug is moved in one direction to secure said shaft to said driving sleeve for rotation of said disc knife thereby, and means operable to move said latching plug into wedging engagement with said notch in said shaft.

4,031,792

HAMMER RAM PRESS

Alexander Borzym, Dearborn, and John J. Borzym, Birmingham, both of Mich., assignors to Alpha Industries, Inc., Detroit, Mich.

Filed July 12, 1976, Ser. No. 704,344
Int. Cl.² B26D *5/14*
U.S. Cl. 83—601 **4 Claims**



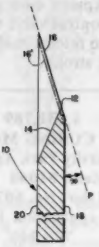
1. A press comprising, in combination, a rigid frame including a portion adapted to support a first member of a die set; a ram adapted to support a second member of the die set and traverse the second member relative to the first member; a parallelogram linkage connecting the ram to the frame including a link and a rocker arm pivotally connected to the frame for rotation about first and second axes and pivotally connected directly to the ram at third and fourth axes, the said four axes being parallel and passing through the vertices of a parallelogram; a power-driven crankshaft rotatably mounted on the frame including a crank throw; and a connecting rod coupling the crank throw to the rocker arm so that the rocker arm and link are oscillated upon rotation of the crankshaft to move the ram and second die member.

4,031,793

BAND KNIFE TOOTH SHAPE

Leonard Miaskoff, Easton, Pa., assignor to Harris Corporation, Cleveland, Ohio

Filed May 3, 1976, Ser. No. 682,624
Int. Cl.² B26D *1/46;* B23D *61/12;* B27B *33/06*
U.S. Cl. 83—788 **2 Claims**



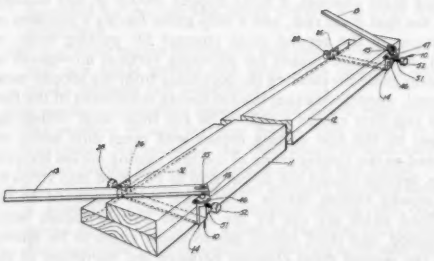
1. Apparatus for cutting sheet material comprising a cutting blade, first means for longitudinally moving said cutting blade across workpiece so as to produce a cutting action, and second means for transversely moving said blade and said workpiece relative to one another so as to sever said workpiece along a cutting plane, and wherein said cutting blade has substantially parallel first and second sides, a back edge and a cuttting edge, said cutting edge being formed along a beveled surface being inclined with respect to said sides so as to join said first side at an obtuse angle and said second side at an acute angle, said beveled surface being generally serrated by scallops disposed at an acute angle to said beveled surface and an obtuse angle to said second side such that the cutting edge formed at the intersection of said beveled surface with said scallops lies entirely within the plane of said beveled surface, said second means for transversely moving said blade and said workpiece relative to one another being adapted to move said blade and said workpiece so that said cutting plane including said serrated cutting edge is substantially coincident with said beveled surface.

4,031,794

PORTABLE JIG FOR RAFTER CUTS AND OTHER ANGLE CUTS

Joseph Q. Leihgeber, Rte. No. 1, Box 164A, Fayetteville, Ohio 45118

Filed June 25, 1976, Ser. No. 699,694
Int. Cl.² B27G *9/04*
U.S. Cl. 83—829 **8 Claims**



1. A portable saw guide for a hand operable saw, said saw guide comprising:

a. a base member including means for clamping said base member to an elongated horizontally disposed work piece supporting surface wherein said base member includes a first portion extending transversely of and underlying said

supporting surface and a second portion disposed to one side of said supporting surface, said second portion of said base member comprising a first section extending vertically upward from said first portion adjacent said work piece supporting surface and a second portion extending horizontally from said first section and in a direction away from said work piece supporting surface, said second section including an aperture extending vertically therethrough;

b. a vertically disposed pin mounted in said vertical aperature of said second portion of said base member for rotation about its axis, said vertically disposed pin including a head section overlying said second portion and a shoulder having a cross sectional dimension greater than the cross sectional dimension of said aperture for seating said head section on said base member second section overlying said aperture, said vertically disposed pin having a cylindrical extension depending from said shoulder rotatively through said aperture, said cylindrical extension including an annular depression extending at least partially thereabout;

c. an elongated guide blade pivotally secured at one end to said head section and swingable between a position vertically disposed from said work piece and a substantially horizontal position overlying said work piece, said guide blade being rotatable with said pin so as to overlie said work piece at any selected angle relative thereto; and

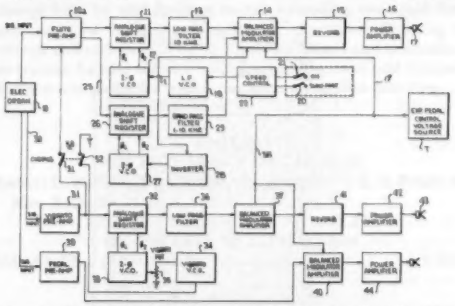
d. means for locking said pin for maintaining said guide blade at said selected angle comprising a brake pad cooperatively associated with said annular depression and means for selectively urging said brake pad into and out of frictional engagement with said annular depression.

4,031,795

TONE SIGNAL MODULATION SYSTEM

David A. Bunger, Cincinnati, Ohio, assignor to D. H. Baldwin Company, Cincinnati, Ohio

Filed June 20, 1975, Ser. No. 588,627
Int. Cl.² G10H *1/02*
U.S. Cl. 84—1.25 **11 Claims**



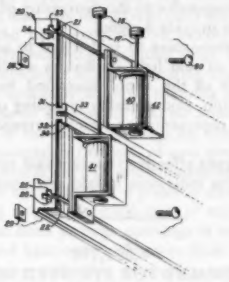
1. An electric organ system, comprising an electric organ having a flute signal output lead and a heterosignal output lead, means including a first analogue shift register means for modulating the frequency of said flute signal, amplitude modulation means in cascade with said analogue shift register, oscillator means providing modulating signal to said analogue first shift register means and to said amplitude modulator means, a first loudspeaker responsive to the output of said amplitude modulator means, means including a further analogue shift register for modulating the frequency of said heterosignal, said heterosignal being exclusive of said flute signal, a second loudspeaker connected in cascade with said further analogue shift register, and switch means operable for transferring signal from said heterosignal output lead to the input of said first analogue shift register means, said first and second loudspeakers being spatially separated sufficiently to represent distinct acoustic sources.

4,031,796

SOLENOID MOUNTING ASSEMBLY FOR MUSICAL KEYBOARD

Thomas Jewel Wilkes, Lewisburg, Tenn., assignor to Teledyne, Inc., Los Angeles, Calif.

Filed Apr. 28, 1976, Ser. No. 681,095
Int. Cl.² G10C *3/20*
U.S. Cl. 84—20 **7 Claims**



1. In a keyboard musical instrument, a solenoid mounting member for a plurality of solenoid operated key actuating assemblies, each key actuating assembly having a mounting bracket which includes a back plate, said solenoid mounting member being constituted by an extruded plate member,

said extruded plate member having at least one elongated channel in a surface thereof, said at least one elongated channel having side walls and means in said side walls for threadably receiving a threaded fastener member passing through an end of said back plate, and

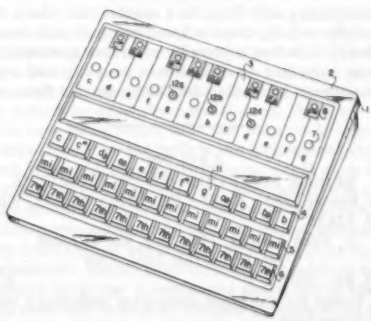
an elongated rib on said plate member and projecting from said plate, said rib having a groove formed in said rib projection and opening in a direction transverse to the direction of said channel, said groove adapted to receive a flange projecting from an end of said back plate.

4,031,797

POCKET-SIZE MUSICAL CHORD STUDY AID

Arthur R. Schmoyer, The Cedars, Rte. 16, Woolford, Md. 21677

Continuation-in-part of Ser. No. 578,032, May 16, 1975, Pat. No. 3,954,040. This application Feb. 20, 1976, Ser. No. 659,978
Int. Cl.² G09B *15/00*
U.S. Cl. 84—470 **9 Claims**



1. A study aid for use in self instruction in the make-up of musical chord triads, said study aid comprising a self-contained unit including a relatively flat casing dimensioned appropriately for carrying in a pocket, said casing having

A. a face surface including

A. a display panel in a format representative of keys of a musical instrument keyboard and including
   a. indicia of the respective notes represented by said format of keys,
   b. light indicators respectively associated with said note representations
B. a series of push-buttons representative of notes by which chords are identified,

said study aid further including

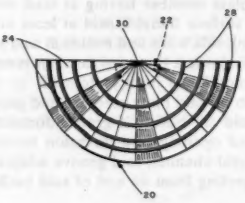
C. means responsive to the depression of a selected push-button to provide a signal,
D. means responsive to said signal to activate a certain plurality of said light indicators which correspond to the notes of the chord identified by said depressed push-button, said plurality including one indicator for the note representation which corresponds to said key, and
E. latch means effective to retain said certain plurality of chord note indicators in said activated state.

4,031,798

SOUNDBOARD FOR STRINGED MUSICAL INSTRUMENTS

Arthur E. Snider, 158 North Hazel, St. Paul, Minn. 55133

Filed Oct. 31, 1975, Ser. No. 627,390
Int. Cl.² G10D 3/02
U.S. Cl. 84—291 **9 Claims**



1. A soundboard for stringed musical instruments comprising a solid sheet which is radially/circumferentially anisotropic and which comprises a plurality of longitudinally-grained, wooden sections radiating from the focal point of the sheet and wherein said sheet includes a plurality of curved braces concentric about the focal point of said sheet.

3. A plucked-string musical instrument comprising tensioned strings, a soundboard, and means coupling said strings to said soundboard wherein the improvement comprises a soundboard which is a radially/circumferentially anisotropic sheet comprising stiff fibers in a matrix, said fibers running substantially radially from a focal point of said sheet, said soundboard including a plurality of braces concentric about said focal point and wherein means coupling said strings to said soundboard is a bridge attached near said focal point.

4,031,799

BRIDGE FOR STRINGED INSTRUMENTS

C. Leo Fender, 2851 Rolling Hills Drive Sp. 33, Fullerton, Calif. 92635

Filed Jan. 26, 1976, Ser. No. 652,408
Int. Cl.² G10D 3/04, 3/00
U.S. Cl. 84—307 **6 Claims**

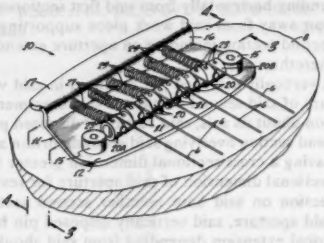
1. A bridge for a stringed instrument including a body and a neck comprising:

a base member rigidly connectable to said body of said instrument;

a plurality of drums;

means connecting said drums to said base member in end-to-end relationship for independent lateral movement in two orthogonal directions to separately adjust the length of each string and the height of each string relative to said neck;

a fixed post connected to said base member, adjacent one end of the first one of said drums; and



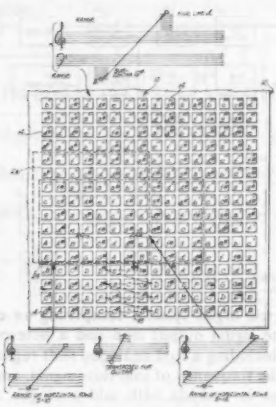
means operatively positioned adjacent said drums for conducting said strings into engagement with said drums connecting means and said drums so as to apply an axial force to each of said drums and to urge all of said drums axially into contact with each other and said first drum into contact with said post.

4,031,800

KEYBOARD FOR A MUSICAL INSTRUMENT

Geary S. Thompson, 700 Schons Place, Wenatchee, Wash. 98801

Filed July 16, 1976, Ser. No. 705,789
Int. Cl.² G10C 3/12
U.S. Cl. 84—423 **8 Claims**



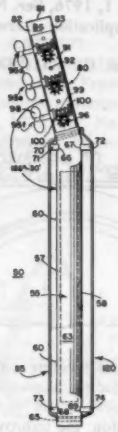
1. A keyboard for a musical instrument of a type which includes means for producing musical tones when the keys are touched, wherein each key of the keyboard represents a particular tone, said keyboard comprising a two-dimensional pattern of at least six horizontal rows of keys and at least six perpendicular vertical rows of keys, wherein the tones represented by the keys are arranged horizontally from left to right in ascending half-steps and are stacked vertically in ascending perfect fourths, and wherein the cener-to-center spacing of the keys, both horizontally and vertically, is no greater than about one inch.

4,031,801

STRINGED MUSICAL INSTRUMENT

Jack Cecchini, 5344 N. Magnolia, Chicago, Ill. 60640

Filed May 17, 1976, Ser. No. 687,145
Int. Cl.² G09B *15/06*
U.S. Cl. 84—465 **10 Claims**



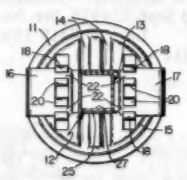
10. A practice device, comprising a longitudinally extending member having dimensions similar to the neck of a stringed instrument, spaced apart frets extending transversely of said member on one surface thereof, means on said member for holding a plurality of longitudinally extending and transversely spaced apart strings over said frets above said one surface and over and above the surface opposed to said one surface, and means for maintaining one set of tensions in strings held by said holding means extending over said one surface and for maintaining another set of tensions in strings held by said holding means extending over said opposed surface, whereby strings held by said holding means extending over said frets and said one surface are useful for practicing fingering of chords and strings held by said holding means and maintained in tension by said tension means extending over said opposed surface are useful for practicing strumming and plucking.

4,031,802

HOLLOW SHEET METAL NAIL

Robert L. Hallock, Boca Raton, Fla., assignor to E. S. Products, New Rochelle, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,211
Int. Cl.³ E01B *9/12*; **F16B** *15/04*
U.S. Cl. 85—11 **1 Claim**



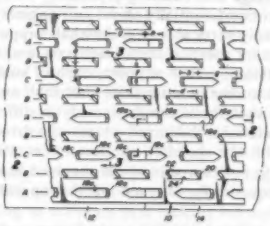
1. A one-piece hollow sheet metal nail for attaching a non-woven covering material to a lightweight insulating base material comprising a head, a pair of connecting strips integrally connected to opposite sides of said head and being bent to a position underlying the same, the other ends of said strips being attached to one end of a pair of interfitting generally U-shaped legs, each of said legs including a pair of generally parallel sides connected by a bight portion, the sides of one of said legs being nested within the sides of the other leg and defining a hollow enclosure before being driven, the ends of the sides of one of said legs being bent away from the sides of the other leg adjacent to said head to facilitate the nesting together of said legs, the other end of said legs being of substantially the same dimension as said one end and defining a penetrating portion, the bight portion of at least one of said legs being curved toward the other leg intermediate the ends for deflecting at least one of said legs outwardly when said nail is driven into the base material, the penetrating portion of each of said legs including a cutting edge along said bight portion and an upwardly inclined shearing edge along each of said sides, said upwardly inclined shearing edges being disposed at an angle of at least 20° and not more than 45° from a plane normal to the axis of said legs for cutting a plug from said covering material, a first pair of ears struck downwardly from said head beside each of said connecting strips and bent inwardly toward each other to a position underlying each of said connecting strips, a second pair of ears struck downwardly from said head through openings in each of said connecting strips and bent outwardly away from each other to a position underlying said strips connecting said other ends of said strips to said head, whereby when said nail is driven said cutting and shearing edges sever a plug from said covering material and thereafter said means for deflecting said legs causes said legs to spread apart.

4,031,803

CONNECTOR PLATE

John Calvin Jureit, Coral Gables, and Benjamin H. Kushner, Miami, both of Fla., assignors to Automated Building Components, Inc., Miami, Fla.

Filed Apr. 30, 1976, Ser. No. 681,839
Int. Cl.² F16B *15/00*
U.S. Cl. 85—13 **2 Claims**



1. A connector plate for joining members in abutting relationship comprising: an elongated plate, a plurality of elongated projecting nail-like teeth struck from said plate thereby leaving a plurality of slots in said plate, said teeth projecting from one side of said plate, said teeth being struck in longitudinally extending generally parallel rows, the teeth in first alternate rows being struck such that the slots left thereby in said plate extend from the teeth in like longitudinal directions, the teeth in second alternate rows being struck such that the slots left thereby in the plate extend from the teeth in opposed direction to said slots formed in said first alternate rows, a row of teeth between each of said first and second alternate rows with the teeth therein being struck to form a plurality of sets of longitudinally spaced pairs of teeth, the teeth in each set being struck such that a continuous slot is left in said plate between said teeth in each set with the portions of the slot left by each tooth of each set extending therefrom toward the opposite tooth of each set, successive teeth in said first alternate rows thereof being spaced longitudinally and relative to said sets of teeth in next adjacent rows such that each successive tooth lies between each successive set of teeth, and successive teeth in said second alternate row thereof being spaced longitudinally and relative to said sets of teeth in next

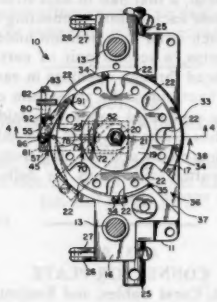
adjacent rows such that each successive tooth lies between said pairs of teeth forming said set.

4,031,804

ROTARY SHOT SHELL RELOADER

Richard C. Boschi, Euclid, Ohio, assignor to Pacific Gunsight Company, Grand Island, Nebr.

Filed June 16, 1975, Ser. No. 586,962
Int. Cl.² F42B *33/00*
U.S. Cl. 86—23 **10 Claims**



1. In a shot shell reloader of the type including a base structure, an elevatable carriage supported on the base structure, a positioning mechanism for raising and lowering the carriage relative to the base structure, a plurality of tools supported above the carriage and defining a plurality of operating stations spaced circumferentially about an imaginary circle having a substantially vertical axis, a shotshell support supported by the carriage for rotation about such axis, and a plurality of spaced formations on each support, each of such formations being adapted to receive a separate shot shell and to position such received shot shells simultaneously in different ones of the operating stations, the improvement of a drive mechanism engageable with the shotshell support for rotating the shotshell support to position shot shells received in such support formations sequentially in each of the operating stations, comprising:

a. first cam means including a curvilinear cam surface;

b. second cam means including a cam follower for engaging said cam surface;

c. an arm supported on the elevatable carriage and being pivotally movable about such axis between first and second positions;

d. one of said cam means being supported on said arm, and the other of said cam means being supported on the base structure;

e. biasing means operably connected to said arm to bias said cam follower and said cam surface relatively toward engagement with each other;

f. said first and second cam means and said biasing means being operable, in response to raising of the carriage by the positioning mechanism to pivot said arm in a forward direction about such axis from said first position to said second position, and in response to lowering of the carriage by the positioning mechanism to pivot said arm in a reverse direction about such axis from said second position to said first position; and

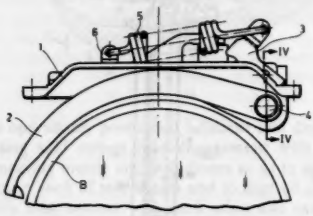
g. pawl means carried by said arm for drivingly engaging the rotatable shotshell support when said arm is pivoted in a selected one of said forward and reverse directions to rotate such support and to move such received shot shells between adjacent operating stations.

4,031,805

APPARATUS FOR EJECTING A TRANSPORT AND LAUNCHING CONTAINER FROM A MISSILE LAUNCHER

Dietmar Puttinger, Munich, and Manfred Fischer, Ottobrunn, both of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Germany

Filed Nov. 1, 1976, Ser. No. 737,561
Claims priority, application Germany, Nov. 11, 1975, 2550587
Int. Cl.² F41F *5/00*
U.S. Cl. 89—1.5 G **6 Claims**



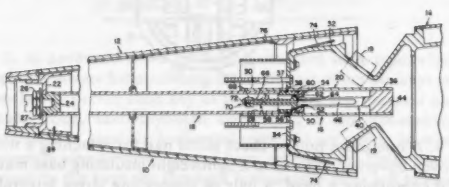
1. In an apparatus for ejecting a missile container from a missile launcher, including a pivoted ejector lever means movable between a first, ready to operate position and a second operated position; the improvement comprising movable anchor means, first spring means coupled between said movable anchor means and said ejector lever means, actuating means comprising means for moving said anchor means to load said first spring means and thereby apply a first torque to said ejector lever means in the direction to move said ejector lever means to said second position thereof for ejecting said container, first catch means coupled to said anchor means for holding said first spring means in a loaded state, second catch means for holding said ejector lever means at said first position thereof, said actuating means further comprising means for releasing said second catch means for movement from said first position to said second position, means responsive to movement of said ejector lever means to said second position for releasing said first catch means, and second spring means coupled to apply a second torque to said ejector lever means in a direction to move said ejector lever means to said first position thereof, said second torque being smaller than said first torque, whereby said second spring means move said ejector lever means to said first position only in response to release of said first catch means.

4,031,806

INTERNAL UMBILICAL CONNECTOR FOR MISSILES

Sidney Stark, and Fred T. Sumner, both of Orlando, Fla., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 1, 1976, Ser. No. 719,499
Int. Cl.² F41F *3/04*
U.S. Cl. 89—1.811 **5 Claims**



1. A missile having a movable nose cone, a body section, and internal umbilical connectors carried in said body section, means for retention of said nose cone and said body section in

spaced relation to give access to said internal umbilical connectors and for controlling the impact velocity of said nose cone and body section during closure thereof responsive to predetermined acceleration forces acting on said nose cone.

4,031,807

ARMOURED ASSAULT CAR

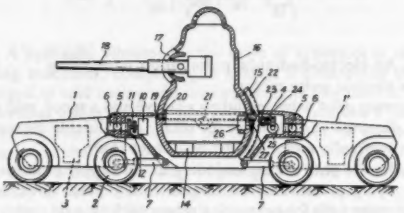
Jean-Jacques Boyer, Montchauvet, France, assignor to Societe Anonyme Secmafer, Buchelay, Mantes, France

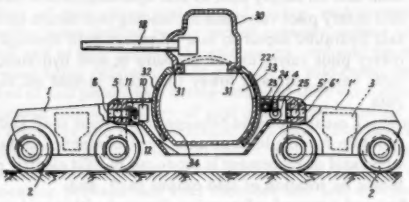
Filed Sept. 8, 1975, Ser. No. 611,334

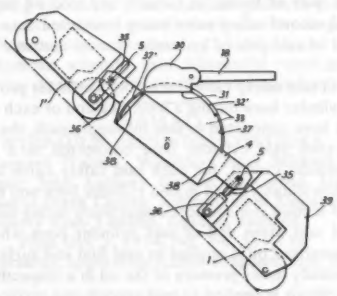
Claims priority, application France, Sept. 20, 1974, 74.31830

Int. Cl.² F41H 7/02

U.S. Cl. 89—36 K **10 Claims**







1. An armoured assault car comprising a central chassis articulated at each of its two ends on a bogie chassis by a transverse shaft and a longitudinal shaft, with at least one monitoring device acting between the central chassis and the chassis of one of the bogies for controlling the relative transverse slope of the central chassis relatively to the bogie chassis, in which at least the gun turret of the armoured assault car is mounted on the central chassis whilst being articulated to pivot about an axis which is transverse to the longitudinal axis of the central chassis and fixed relative to the central chassis, with means for monitoring the relative longitudinal slope between the gun turret and the central chassis.

4,031,808

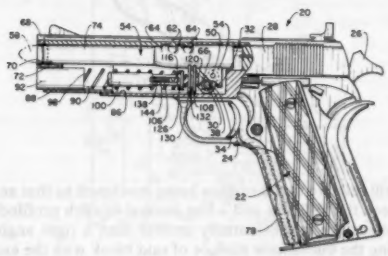
HANDGUN APPARATUS

Clarence A. Raville, P.O. Box 377, Thousand Oaks, Calif. 91360

Division of Ser. No. 343,560, March 21, 1973, Pat. No. 3,901,125. This application Aug. 7, 1975, Ser. No. 602,566

Int. Cl.² F41D 11/06

U.S. Cl. 89—163 **6 Claims**



1. In combination with a semi-automatic handgun which has a barrel mounted within a slide, said barrel terminating in a firing chamber at its inner end, a link pivotally connected by a first pivot pin to said barrel at said inner end, said slide mounted for longitudinal movement upon a handgrip housing, said slide being movable between a cartridge firing position and a cartridge ejecting position, with said slide in said cartridge firing position said barrel having a locking lug assembly which cooperates within a locking recess assembly formed within said slide, said link being pivotally connected by a second pivot pin to said handgrip housing, a trigger connected to said handgrip housing, said trigger to be capable of causing firing of a cartridge located within said firing chamber, the improvement comprising:

a protuberance formed upon said link, a means under a constant biasing force being in continuous contact with said protuberance, with said slide in said cartridge firing position the biasing force of said means being transferred through said protuberance so as to apply a torque in respect to said link tending to maintain said locking lug assembly of said barrel into full cooperation with said locking recess assembly formed within said slide, with said slide in said cartridge ejecting position the biasing force of said means being transferred through said protuberance into said link so as to exert a torque about said link tending to maintain said locking lug assembly disassociated from said locking recess assembly.

4,031,809

METHOD OF MACHINING CURVILINEAR SURFACES

Evgenia Isaevna Shraiman; Isai Beniaminovich Shraiman, both of ulitsa Saltykova-Schedrina, 23, kv. 10; Eduard Iosifovich Tsesevich, Liteiny prospekt, 34, kv. 17; Viktor Leonidovich Dobroslavsky, ulitsa Varshavskaya, 110, kv. 5; Nikolai Ivanovich Ivanov, prospekt Kultury, 15, korpus 2, kv. 64, and Pavel Pavlovich Lebedev, prospekt Morisa Toreza, 80, kv. 99, all of Leningrad, U.S.S.R.

Filed Oct. 10, 1975, Ser. No. 621,616

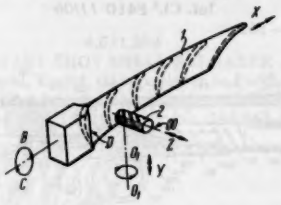
Claims priority, application U.S.S.R., Oct. 14, 1974, 2079351

Int. Cl.² B23C 3/04

U.S. Cl. 90—11 C **9 Claims**

1. A method for machining curvilinear surfaces of workpieces of the type of turbine blades by circular milling comprising: rotating a blank and mill and applying thereto a profile generation displacement with respect to the rotational axis of the blank imparting to the blank and mill a relative displacement along the rotational axis of the blank and the profile generation displacement during rotation of the blank and mill, the direction of said profile generation displacement being at

an angle from substantially 45° to 135° with respect to the rotational axis of the blank, said relative displacement being imparted at an angle substantially smaller than a right angle with respect to the rotational axis of the blank and to the direction of said profile generation displacement; positioning



the mill relative to the surface being machined so that an angle between the mill axis and a line normal to each profiled point of the surface is substantially smaller than a right angle; and shaping the curvilinear surface of said blank with the end face of the mill.

4,031,810

ROTATING SPINDLE AND TOOL UNIT

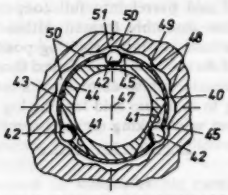
Fritz Nattefort, Leichlingen, Germany, assignor to The Precise Corporation, Racine, Wis.

Filed July 26, 1976, Ser. No. 708,610

Claims priority, application Germany, Oct. 3, 1975, 2544558

Int. Cl.² B23C 5/26

U.S. Cl. 90—11 A **9 Claims**



1. In combination:

a spindle rotatable about a longitudinal axis and for use in supporting a tool unit for rotation about said longitudinal axis, said spindle having an end including a cavity therein co-axial with said axis, said cavity including a surface having a plurality of circumferentially spaced recesses; and

a tool unit for supporting a tool and axially receivable within said cavity for rotation about said longitudinal axis with said spindle, said tool unit including a neck portion having a plurality of radially outwardly projecting balls spaced apart around its circumference, said outwardly projecting balls being radially shiftable and receivable within said recesses when said tool unit is received in said cavity, and for shifting said balls radially outwardly upon initial relative rotational motion between said tool unit and said spindle for preventing further relative rotation of said tool unit and said spindle and providing a rotational driving connection therebetween.

4,031,811

ELECTRO-HYDRAULIC PULSE MOTOR

Seiuemon Inaba; Kanryo Shimizu, both of Kawasaki; Kohei Ito, Fujisawa; Youichi Amemiya, and Gotaro Gamo, both of Tokyo, all of Japan, assignors to Fujitsu Ltd., Japan

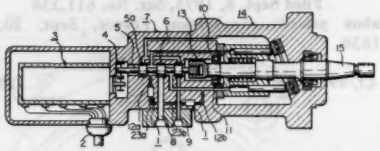
Filed Jan. 19, 1972, Ser. No. 219,087

Claims priority, application Japan, Jan. 29, 1971, 46-3337[U]

The portion of the term of this patent subsequent to May 28, 1992, has been disclaimed.

Int. Cl.² F15B 9/10; F01B 3/10

U.S. Cl. 91—39 **2 Claims**



1. An electro-hydraulic pulse motor comprising

an electric pulse motor,

a rotary pilot valve including a sleeve and a spool, said spool disposed in said sleeve for rotary and slidable movement,

an hydraulic motor having an output shaft,

hydraulic path means including an oil supply path for supplying pressurized oil to said rotary pilot valve, an oil return path for exhausting return oil from said rotary pilot valve,

a pair of hydraulic circuits for leading said pressurized oil from said oil supply path to said hydraulic motor through said rotary pilot valve and for leading said return oil from said hydraulic motor to said oil return path through said rotary pilot valve, the oil pressure in said hydraulic circuits being normally lower than that in said oil supply path,

feedback means coupled between said output shaft and said spool for feeding back an axial displacement of said spool when said displacement is produced by said electric pulse motor by rotation of said output shaft, and

a first and a second safety valve disposed within said sleeve, said first safety valve being connected between a first of said pair of hydraulic circuits and said oil supply path, said second safety valve being connected between a second of said pair of hydraulic circuits and said oil supply path,

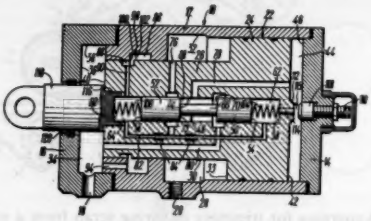
each of said safety valves including a cylinder provided with a cylinder bore having a wall, one end of each said cylinder bore connected to said oil supply path, the other end of each said cylinder bore connected to a respective hydraulic circuit, for each said safety valve an oil-type piston slidably fitted in said cylinder bore and having first and second end surfaces respectively facing said one end and said other end of said cylinder bore whereby said pressurized oil is applied to said first end surface and the normally lower pressure of the oil in a respective hydraulic circuit is applied to said second end surface, a spring disposed in each said cylinder bore for supplying a spring force to said piston first end surface thereby providing a biasing force in addition to the pressure of said pressurized oil for biasing said piston toward said other end of said cylinder bore to a normal initial position, an hydraulic bypass circuit for each cylinder having an inlet and an outlet both formed in said wall of said cylinder bore for fluidly connecting a respective hydraulic circuit to said oil supply path only when said piston is displaced from said initial position by a predetermined rise in the oil pressure in the respective hydraulic circuit.

4,031,812

HYDRAULIC VIBRATOR FOR ACTUATOR DRIVE

Nikolai Vasilievich Koshelev, ulitsa Gagarina, 56, kv. 10, Kuibyshev, U.S.S.R.

Continuation-in-part of Ser. No. 449,281, March 8, 1974, abandoned. This application Apr. 19, 1976, Ser. No. 678,458
Int. Cl.² F01L 21/04; F01B 7/18
U.S. Cl. 91—224 4 Claims



1. A hydraulic vibrator for the drive of actuators in metal-cutting machines, comprising: a casing; a differential piston arranged in said casing and moving reciprocally therein, said differential piston having a first pressure surface and a second pressure surface, the second pressure surface of the piston being larger than the first pressure surface; a spring-balanced slide valve having a plurality of plungers which are arranged coaxially in said differential piston and which move reciprocally therein; said differential piston and said casing being positioned so that they define at least one inlet chamber, one pressurized chamber and one discharge chamber, said inlet chamber being defined at least partially by the first pressure surface of said piston and by said casing, said pressurized chamber being defined by the second pressure surface of said piston and at least partially by said casing, and said discharge chamber being defined at least partially by said casing and by an end of said piston; said spring-balanced slide valve ensuring successive communication of said pressurized chamber with said discharge and inlet chambers; said slide valve defines by its plungers, together with said piston, a plurality of compensating chambers; throttles of constant section providing communication between said inlet chamber and said compensating chambers, said throttles of constant section ensuring a drop in the pressure, as a result of which the pressure in the compensating chambers is less than the pressure in the inlet chamber; and throttles of variable section controlling communication between the compensating chambers and said discharge chamber; whereby said differential piston performs reciprocating displacements smoothly and noiselessly.

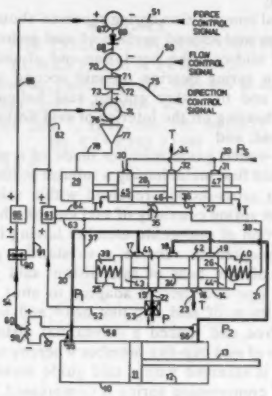
4,031,813

HYDRAULIC ACTUATOR CONTROLS

Ronald Bernard Walters, Wembley; Peter Michael Hamey, Emsworth; John Anthony Gordon Hammond, Guildford, and Thomas Derek Lindon, Ashtead, all of England, assignors to Sperry Rand Limited, London, England

Filed Oct. 3, 1974, Ser. No. 511,739
Claims priority, application United Kingdom, Oct. 10, 1973, 47213/73
Int. Cl.² F15B 11/10, 13/043
U.S. Cl. 91—433 25 Claims

1. In combination with hydraulic actuator means, a device for controlling the flow of fluid to said hydraulic actuator means, said device comprising a fluid pressure operated main valve for regulating the fluid flow to the actuator means; via service lines a pilot valve for controlling the main valve, via control lines said pilot valve including electrical operating means; electrical input means for an electrical input signal; flow sensing means for producing an electrical feedback signal dependent on the rate of fluid flow to the actuator means, said flow sensing means including a pivoted movable element displaceable from a closed flow blocking position in accordance with the fluid flow to be sensed and biased into said position by spring means and mechanical/electrical transducer means for converting such displacement into said feedback



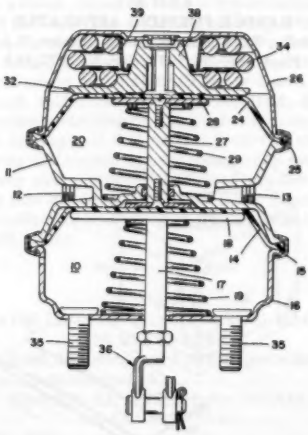
signal; and means for comparing said feedback signal with said input signal to produce an electrical error signal for said electrical operating means to operate said pilot valve in accordance with such comparison.

4,031,814

SELF-CENTERING SPRING ACTUATED AUXILIARY BRAKE MECHANISM

Robert T. Lukens, Plymouth, and Stanley Jaksim, Detroit, both of Mich., assignors to Indian Head Inc., New York, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,033
Int. Cl.² F01B 7/00
U.S. Cl. 92—63 9 Claims



1. A brake actuating mechanism comprising a service brake chamber and a spring actuated auxiliary brake chamber, said spring actuated auxiliary brake chamber comprising:

a. a generally cylindrical cup-like head made of a first metal;

b. an emergency piston made of said first metal received within said head for axial movement therewithin, said piston providing a first flat surface facing the open end of said cup-like head and extending in a plane substantially perpendicular to the axis of said cup-like head and a second surface opposite said first surface providing a boss

of generally circlar cross-section extending along a substantial portion of said axis of said cup-like head and having its minimum external diameter at the free end thereof;

c. a helical compression spring received about said boss and between said second surface of said piston and the bottom of said cup-like head, one end of said helical compression spring bearing on said second surface of said piston and the other end of said helical compression spring bearing on the interior of said bottom of said cup-like head; and

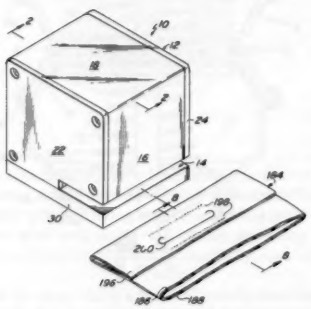
d. a thin-walled guide member made of a metal dissimilar from said first metal having a tubular portion of generally circular cross-section received within said helical compression spring coaxially of said cup-like head, said tubular portion of said guide member having internal dimensions adapted to receive a substantial portion of the length of said boss of said piston, said guide member having one end thereof adapted to abut the interior of said bottom of said cup-like head and extending to an open free end spaced a substantial distance from said bottom of said cup-like member whereby said boss of said piston is received within said guide member when said helical compression spring is compressed, at least one of said cross-section of said boss and said cross-section of said tubular portion of said guide member changing in diameter along the axial length thereof at a greater rate than the cross-section of the other.

4,031,815

HANDLE FORMING APPARATUS

Henry Verbeke, Tannersbrook Road, Chester, N.J. 07930

Filed Apr. 28, 1975, Ser. No. 572,363
Int. Cl.² B31B *1/64*
U.S. Cl. 93—33 H **7 Claims**



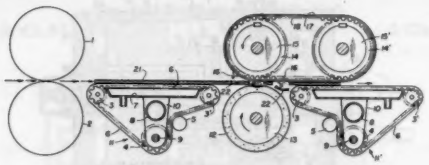
1. An apparatus for forming a handle on a plastic bag comprising a housing, a mouth formed in said housing into which the top of said plastic bag can be inserted, means within said housing for cutting an opening in the top of said plastic bag and heat sealing the walls of said plastic bag together at said cut opening, and means for reciprocating said cutting and heat sealing means, said cutting and heat sealing means comprising a flat wire, with the edge of said wire contacting said plastic bag during reciprocation.

4,031,816

APPARATUS FOR TRIMMING ADHERING SCRAP FROM A PUNCHED CARDBOARD BLANK

Masaharu Matsuo, No. 3-17, 3-Chome, Higashi Komagata, Sumida,Tokyo, Japan

Filed May 19, 1976, Ser. No. 687,687
Claims priority, application Japan, July 14, 1975, 50-85339
Int. Cl.² B26F *3/02*
U.S. Cl. 93—36 A **8 Claims**



1. Apparatus for trimming adhering scrap from a punched cardboard blank comprising:

a. two conveyors having respective driven surface portions defining successive parts of a path of travel for said punched blank and spaced from each other in the direction of said travel;

b. a roller mounted between said conveyors for rotation about an axis and having a resilient surface layer, said path being substantially tangential to said layer;

c. a first pulley separated from said roller by said path;

d. a second pulley offset from said first pulley in said direction along said path, said pulleys being mounted for rotation about respective axes;

e. a carrier trained over said pulleys in a closed loop and bounding said path in a direction transversely away from one of said surface portions;

f. a plurality of ejector members mounted on said carrier projecting therefrom into said path; and

g. drive means operatively connected to said conveyors, said roller, and one of said pulleys for simultaneously moving said surface portions, said surface layer, and said carrier at the same speed in the same direction along said path.

4,031,817

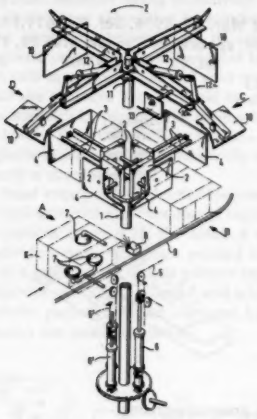
CARTON HANDLING APPARATUS

Josef Raschke, Sommerhausstrasse 11, 8011 Gelting, Germany

Filed July 29, 1975, Ser. No. 600,126
Int. Cl.² B31B *1/32*
U.S. Cl. 93—44.1 R **8 Claims**

1. Apparatus for the unfolding of cartons and closing the flaps of the bottoms or tops thereof, comprising: at least two diametrically opposite holders (4), means for moving said holders continuously together along a circular path, holder control means connected to said two holders comprising at least one control rod common to said holders and means moving said control means towards and away from the axis of

said circular path whereby each holder moves alternately into a carton to be folded to fix and carry the carton along said



circular path and out of the folded carton while the opposite holder moves synchronously out of and into a carton.

4,031,818

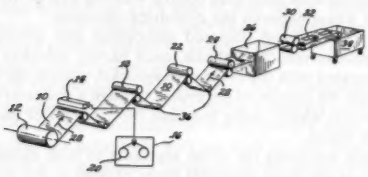
APPARATUS FOR PREPARING SEALED ENVELOPE UNITS WITH MESSAGES

James W. Kehoe, Shelby, Ohio, assignor to GAF Corporation, New York, N.Y.

Division of Ser. No. 515,428, Oct. 16, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,694

Int. Cl.² B31B *19/00*

U.S. Cl. 93—63 R **7 Claims**



1. Apparatus for forming pre-printed, cut, and folded message units comprising:

means for receiving and holding a single roll of paper adapted to supply to said apparatus a single-thickness paper web having a grain running parallel to the longitudinal axis of said web;

friction roller advancing means, adapted to advance said single-thickness web off of a roll of paper held by said receiving and holding means;

means for continuously printing predetermined messages on said single web by forming characters of said messages in a direction parallel to the longitudinal axis of said paper web as said web is continuously advanced in a longitudinal direction;

means connected to said printing means for directing said printing means to print individual and different subject matter along various segments of said web as the web is moved through said continuous printing means;

means for applying adhesive to said single web in predetermined locations as said web is advanced;

means for folding said web into a desired message unit configuration, said folding means being positioned to receive said web after the web has passed through said continuous printing means and said adhesive applying means; and

means for cutting said web into individual segments to form individual message units.

4,031,819

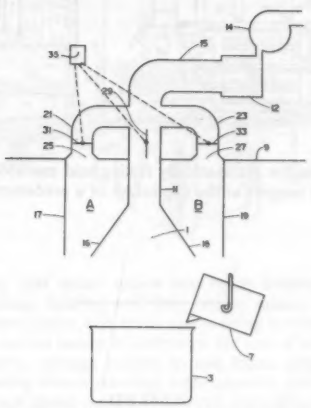
APPARATUS FOR COLLECTING AND CONVEYING OF FUMES FROM A FURNACE

Grant D. Applewhite, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed Jan. 7, 1976, Ser. No. 647,059

Int. Cl.² F23J *11/00*

U.S. Cl. 98—115 R **6 Claims**



1. In combination with a furnace having an opening therein, an apparatus for the collecting and conveying of fumes from said furnace comprising: a fume hood spaced from and disposed in communication with the opening in a furnace; a housing spaced from said fume hood, the spacing between said housing and said fume hood defining a fume collecting reservoir; and, exhaust means in flow communication with said fume hood and said fume collecting reservoir with flow control means therein to selectively control the flow of fumes from said fume hood and said fume collecting reservoir, said flow control means including first damper means controlling flow through said fume collecting reservoir; and second damper means controlling flow through said fume hood and, means for moving said first damper means to one position while moving said second damper means to an opposed position whereby said positions determined whether said fume hood is in flow communication with said exhaust means or said fume collecting reservoir is in flow communication with said exhaust means.

4,031,820

AUTOMATIC LIFTING AND LOWERING MECHANISM FOR DEEP FRYERS

Buckley R. Reed, Jeffersontown, Ky., assignor to Reed & Associates, Inc., Jeffersontown, Ky.

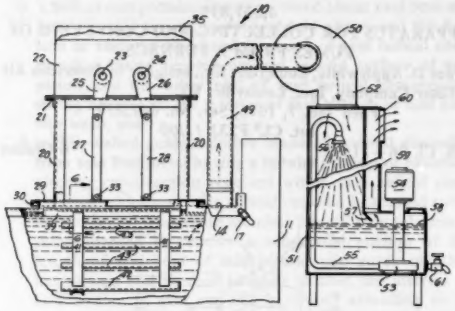
Filed Feb. 13, 1976, Ser. No. 657,846

Int. Cl.² A47J *37/12*

U.S. Cl. 99—336 **6 Claims**

1. An automatic lifting and lowering mechanism for attachment to deep fryers of the type having an open top comprising a detachable cover for the open top of the deep fryer, a generally rectangular central opening formed in said cover, a generally rectangular horizontal frame arranged in upwardly spaced relation to said opening in said cover, a plurality of legs extending upwardly from said cover supporting said frame, a movable cover for closing the opening in said first named cover, a food support suspended below said movable cover, means on said frame for raising and lowering said movable cover and the food support suspended therebeneath vertically

to simultaneously immerse food on said food support in said deep fryer and covering the opening in said first named cover,



and means for automatically raising said movable cover and said food support at the expiration of a predetermined time.

4,031,821

FOOD PROCESSING MACHINERY

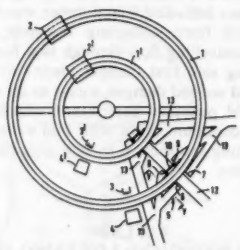
Peter William Loose, and Martyn Ridley Tamkin, both of Chelmsford, England, assignors to Gardenia Limited, St. Peter's Port, Guernsey, Guernsey (Channel Is.)

Filed Apr. 21, 1976, Ser. No. 678,801

Claims priority, application United Kingdom, Apr. 29, 1975, 17819/75

Int. Cl.² A23N *15/02*

U.S. Cl. 99—643 **10 Claims**



1. In a machine for cutting off the heads of carrots which comprises a cutting station, a conveyor for carrying carrots with random head first or tail first orientation to the cutting station and apparatus operative to sense the orientation of each carrot for controlling the cutting station such as to remove the head of the carrot, the improvement wherein said apparatus operative to sense the direction of orientation of each carrot comprises light sensitive means, a light source for projecting an image of the object on the light sensitive means, means for detecting the leading and trailing edge of each carrot, a circuit connected to the light sensitive means for producing an electrical output signal representative of the proportion of the area of the light sensitive means occupied by the image of the object and means for determining the sense of variation in said electrical output signal as the object is moved past the light sensitive means by the conveyor.

4,031,822

PRINTING PRESS

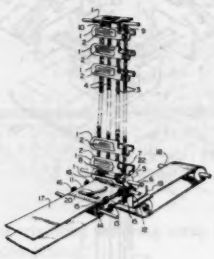
Roy P. Wilson, 84 Cambridge St. North, Lindsay, Ontario, Canada

Filed Mar. 29, 1976, Ser. No. 671,133

Claims priority, application Canada, May 20, 1975, 227318

Int. Cl.² B41L *45/08*

U.S. Cl. 101—53 **5 Claims**



1. A printing press comprising:

a. a multiplicity of drum segments, having similar radii or curvature, for carrying printing type on their convex surfaces,

b. a pressure wheel comprised of two spaced coaxial cylindrical portions, each having a similar radius of curvature as each of the drum segments, at least one cylindrical portion containing a slot which accommodates a sequential count changing and printing apparatus, each of the drum segments containing a gap to accommodate the protrusion of type from said count changing and printing apparatus,

c. a pressure plate located adjacent the pressure wheel,

d. a pair of spaced sprocket wheels having a smaller diameter than the diameter of said pressure wheel portions mounted with their axes coaxial with the axis of the pressure wheel between the cylindrical portions,

e. a pair of chains disposed orthogonal and around the respective sprocket wheels, each having sprocket holes integrated with the respective sprocket wheels, the width across the outside of the chains through a diameter of the sprocket wheels being less than the diameter of the pressure wheel,

f. means mounting the drum segments to both chains, the axes of the drum segments being parallel to the pressure wheel axis, whereby, upon rotation of the sprocket wheels, the chains are progressively drawn around the axis of the pressure wheel in unison, and the drum segments are sequentially drawn around and bear upon part of the pressure wheel between the pressure wheel and the pressure plate to imprint stock passing therethrough, while the sequential count changing and printing apparatus simultaneously imprints and further indexes.

4,031,823

SCREEN PRINTER WITH ADJUSTABLE SCREEN SUPPORT AND MAGNETIC SQUEEGEE MEANS

George S. McGee, 2311 E. 28th St., Chattanooga, Tenn. 37407

Continuation of Ser. No. 391,980, Aug. 27, 1973, abandoned. This application May 23, 1975, Ser. No. 580,408

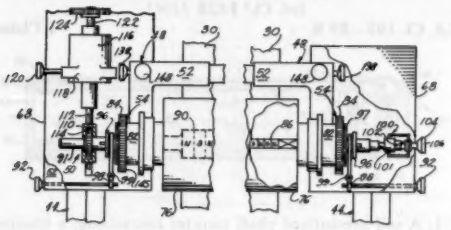
Int. Cl.² B41F *15/44*, *15/38*

U.S. Cl. 101—120 **14 Claims**

1. In a variable pressure device for applying pressure to a continuously moving material: an elongated magnetic roller having both North and South magnetic poles along the length thereof, an elongated magnetic member extending coextensively with said elongated magnetic roller and having both North and South magnetic poles along the length thereof, said North and South poles on the magnetic roller being located in opposed relation with the North and South magnetic poles on

the magnetic member and within sufficient distance whereby the magnetic forces on the magnetic roller are affected by the magnetic forces on the magnetic member, said magnetic roller and said magnetic member being selectively relatively movable coextensively along respective longitudinal axes so as to vary magnetic attraction therebetween by selectively placing opposite magnetic poles in closer alignment to increase pressure between said magnetic roller and said magnetic member or to decrease the pressure between said magnetic roller and said magnetic member by placing like magnetic poles in closer alignment, whereby the pressure between said magnetic roller and said magnetic member may be selectively varied by means of relative motion therebetween.

8. A multi-head rotary screen printer for printing on continuously conveyed material a succession of repeated lengths of a composite pattern created by the total of a succession of lengths of individual pattern repeats printed in succession on the material as it advances from one pattern repeat to the next until the composite pattern is achieved and wherein the length of the composite pattern can be changed by changing the distance between the pattern repeats:



an elongated frame having conveyor means thereon for conveying a continuous length of material to receive the composite pattern printed thereon, opposed sides on the top of the elongate frame each comprising an elongated head support on each side of said frame, a plurality of printer head assemblies each having two ends and having screen printing means thereon for screen printing each of said pattern repeats and;

means for changing the length of said composite pattern comprising means for adjustably mounting each of said ends of said assemblies on the respective head support, means for selectively locking each of said printer head assemblies in selected positions on said head supports and means for selectively driving said screen printing means in each of said selected positions, whereby each of said printer head assemblies may be repositioned with respect to the other printer head assemblies longitudinally of the frame either in the direction of or opposite to the direction of movement of the material to adjust the distance between head assemblies and thereby change the composite pattern.

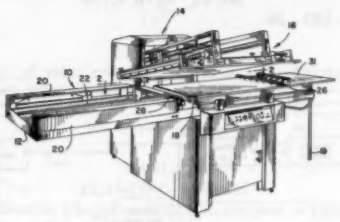
4,031,824

SHEET FEED AND TAKEOFF ASSEMBLY FOR PRINTERS

Henry J. Bubley, Deerfield, and John R. Krutsch, Glenview, both of Ill., assignors to American Screen Printing Equipment Company, Chicago, Ill.

Filed Nov. 3, 1975, Ser. No. 628,151
Int. Cl.² B41F *15/20, 15/22*
U.S. Cl. 101—126 **5 Claims**

1. A feed and take off assembly particularly for use in conjunction with a printing press to automatically transfer sheet stock, from a first position, where said stock may be registered, through a second position under a printing head, where said stock may be printed on, and to a third position, including a frame, a first gripper means for contacting and feeding a single sheet of stock from said first position to said second position while maintaining registration of said sheet of stock, second gripper means for removing and delivering said single sheet of stock from said second position to said third position, said first gripper means and said second gripper means being mounted near opposite ends of a transfer carriage, said transfer carriage having a plurality of rollers mounted thereon which engage said frame to facilitate movement of said transfer carriage therealong, said transfer carriage maintaining said first gripper means and said second gripper means in fixed spaced relationship relative to one another during movement, a motor means for driving said transfer carriage, said transfer carriage being driven by a drive crank assembly having one end thereof connected to said motor means and an opposite end thereof connected to said transfer carriage, said drive crank assembly having means for translating angular motion



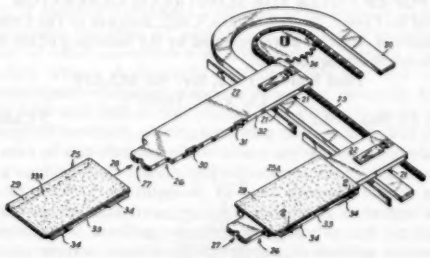
produced by said motor means into linear motion of said transfer carriage bearing said first gripper means and said second gripper means, said motor means being in communication with a control means to determine the rate of movement of said transfer carriage relative to said frame, said control means including circuit selecting cams rotatable about a central axis by said motor means, and circuit controlling switches engaged and activated by said circuit selecting cams to select, at a desired time, a predetermined circuit controlling the speed of the motor means to thereby vary the rate of movement of said transfer carriage relative to said frame thereby providing a single, reliable, unitarily moveable unit for feeding and delivering stock during a printing operation.

4,031,825

PALLET MOUNTING APPARATUS FOR SCREEN PRINTING MACHINES

David Jaffa, Fairlawn, N.J., assignor to Precision Screen Machines Inc., Hawthorne, N.J.

Filed Feb. 13, 1976, Ser. No. 657,872
Int. Cl.² B41F *15/26*
U.S. Cl. 101—126 **10 Claims**



1. A pallet locating apparatus comprising a pallet supporting plate,

said pallet support plate being affixed to the indexing mechanism of a screen printing machine,

means for supporting said pallet on said pallet support plate,

said pallet supporting plate having a first marginal edge extending outwardly from said indexing mechanism,

detenting means for releasably engaging said pallet with respect to said pallet supporting plate,

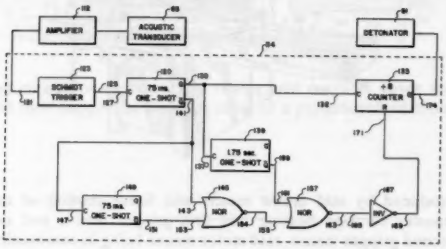
said pallet including a first longitudinally extending side rail, and

locating means for positioning said first side rail in touching engagement with said first marginal edge of said pallet supporting plate.

4,031,826
DETONATION SYSTEM AND METHOD

Frank S. Gemmell, and Mark A. Fried, both of Scottsdale, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 512,651, Oct. 7, 1974, Pat. No. 3,971,317.
This application Dec. 22, 1975, Ser. No. 642,879
Int. Cl.² E21B *43/26*
U.S. Cl. 102—20 **9 Claims**



1. A trigger system for actuating a detonator situated at a remote position, comprising:

conduit means being capable of providing acoustic wave propagation;

transmitting means for sending a predetermined coded acoustic wave signal through said conduit means; said transmitter means further comprising:

encoding means for modulating said transmitter means with a predetermined aperiodic coded electrical signal;

transducer means for converting said predetermined aperiodic coded electrical signal into said aperiodic coded acoustic wave signal for propagation through said conduit means;

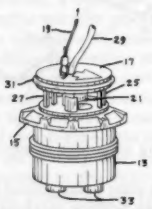
receiving means including means for converting said aperiodic coded acoustic wave signal into an output electrical signal; and

output means responsive to the output electrical signal for triggering the detonator.

4,031,827
POP-UP COVER FOR SLIPSTREAM GENERATOR

David M. Collier, Santa Barbara, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 4, 1976, Ser. No. 663,639
Int. Cl.² F42C *19/06*
U.S. Cl. 102—70.2 G **3 Claims**



1. In an air-flow operated electric bomb charging device for attachment to a bomb having a bomb fuze and including a main housing with a closure and installation ring attached to the upper part thereof carried on the bomb for generating electrical energy to energize the bomb fuze, the improvement comprising a pop-up cover slidably positioned over said installation ring, a lanyard operating to lift said pop-up cover when pulled, an air scoop positioned under said cover for exposure to air-flow when said cover is lifted upward, a bracket positioned between said cover and said air scoop for upward movement when said lanyard is pulled, said bracket including front and rear guide members, said rear guide member including a switch actuator portion as an integral part thereof, and switching means positioned within the main housing of said charging device for connecting a signal carried by a coaxial cable from a remote position to the bomb fuze in response to specific environmental conditions.

4,031,828
PRESSURIZED CHAFF CANISTER

Laverne J. Larson, Boxfod, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

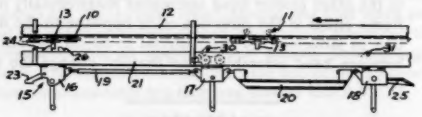
Filed Jan. 28, 1976, Ser. No. 653,056
Int. Cl.² F42B *13/42*
U.S. Cl. 102—89 R **5 Claims**

1. A self pressurized chaff canister comprising: a housing; lining means witin the housing; case means having open ends movably positioned within the lining means; first and second end cap means adapted to cover the ends of said case means, and electric squib means for generating a gas to fill said case means and move said case within the housing.

4,031,829
CONVEYOR SYSTEM

Edward L. Bell, St. Clair Shores, and Ivan L. Ross, Birmingham, both of Mich., assignors to American Chain & Cable Company, Inc., Bridgeport, Conn.

Filed June 2, 1975, Ser. No. 582,844
Int. Cl.² B61B *12/02*; B61J *3/00*
U.S. Cl. 104—172 S **5 Claims**



1. A carrier comprising

a plurality of trolleys adapted to move along a track,

means pivotally interconnecting said trolleys,

a first pusher dog mounted on a foremost trolley,

a second dog mounted on a succeeding trolley and movable to and from operative position for engagement by a pusher of a conveyor,

a third dog mounted on a further succeeding trolley and movable to and from operative position for engagement by a pusher of a conveyor,

and a projection on each of said second and third pusher dogs adapted to be engaged by portions of a track to hold said second and third dogs in inoperative position,

the projection on said second pusher dog extending from one side only of said second pusher dog and the projection on said third pusher dog extending from the opposite

side only of said third pusher dog such that one of said second and third pusher dogs can be permitted to move upwardly into operative position without permitting the other of said second and third pusher dogs to move upwardly.

4,031,830

SAFETY CLAMPING DEVICE FOR PULL-CABLE IN AERIAL CABLEWAY ARRANGEMENT

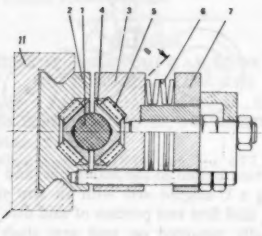
Peter Klaus Hirt, Farchant, and Kurt Switzeny, Cologne, both of Germany, assignors to Pohlig-Heckel-Bleichert Vereinigte Maschinenfabriken Aktiengesellschaft, Cologne-Zollstock, Germany

Filed Jan. 27, 1976, Ser. No. 652,759

Claims priority, application Germany, June 14, 1975, 2526745

Int. Cl.² B61B *12/12*

U.S. Cl. 104—223 **6 Claims**



1. A safety clamping device for a pull-cable in an aerial cableway by which overload protection may be provided between a pull-cable and a trolley of a cableway cabin, said clamping device comprising a first cable-clamping jaw and a second cable-clamping jaw, cable-clamping cups disposed between said cable-clamping jaw, a pull-cable extending between said cable clamping jaws and bilaterally embraced thereby, at least one spring storage means urging said cable clamping jaws toward each other, and a number of synthetic-resin strips extending between said cable-clamping cups and said cable-clamping jaws along the circumference and the length of said clamping device, a pressure plate abutting against one end of said spring storage means with said spring storage means operating against said pressure plate in the case of normal operation of said clamping device to provide a frictional coupling between the trolley and the pull-cable and to store energy, while on the other hand, in the case of pull-cable breakage to allow said synthetic-resin strips to be dropped and said pull-cable to be released and said spring storage means to be detensioned to effect reaction pressure developed and stored by said spring means and transmitted to said cable-clamping jaws.

4,031,831

TABLE FURNITURE

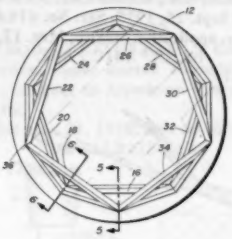
Pauline Dortch Davis, 42 Redwood Road, Severna Park, Md. 21146

Filed Aug. 27, 1975, Ser. No. 608,064

Int. Cl.² A47B *3/06*

U.S. Cl. 108—159 **7 Claims**

1. As an article of manufacture, a furniture structure comprising a base for supporting a horizontally disposed member in spaced relation to a floor, said base consisting only a plurality of triangles of identical size and shape, said triangles alternately extending upwardly and downwardly and being alternately inclined inwardly and outwardly with the locus of the points of said triangles lying on a circle, said triangles having



a plurality of sides extending towards and supporting said horizontally disposed member.

4,031,832

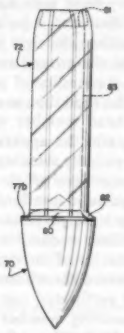
PLANTING SYSTEM

Bryant Edwards, Clarendon Hills, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 538,295, Jan. 2, 1975, abandoned, and a continuation-in-part of Ser. No. 587,561, June 20, 1975, abandoned, and a continuation-in-part of Ser. No. 611,111, Sept. 8, 1975, abandoned. This application Mar. 26, 1976, Ser. No. 670,918

Int. Cl.² A01C *11/02*; A01G *9/10*

U.S. Cl. 111—4 **45 Claims**



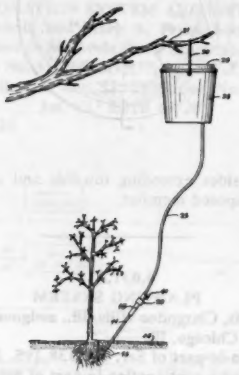
1. A planting method for a plurality of plants such as trees comprising the steps of: providing a plurality of containers each of which comprises a seedling cartridge having a base section with a horizontally extending shoulder and with spaced-apart elongated members extending upwardly from said base and with a thin plastics film disposed about said elongated members, placing a growing medium and plant seed in each of said plurality of containers and growing said plants to a seedling stage therein, thereafter transporting said plurality of seedling cartridges to an open ground planting site, removing the film from one of said seedling cartridges and inserting said seedling cartridge in a planting tool having a tubular section capable of accepting said seedling cartridge with the elongated members longitudinally therein and with the end of said tubular section abutting the upper side of said shoulder and about said base section, pushing said tubular section into the ground until said elongated members are within the ground, and withdrawing said tubular section to leave said seedling cartridge with said seedling growing therein in the ground, and thereafter repeating the foregoing steps from the step of removing the film from one of said seedling cartridges.

4,031,833

INJECTION IRRIGATING PROCESS AND APPARATUS

Cuitlahuac Ibanez, Mexico D.F., Mexico, assignor to Tecnicas de Riego y Abono, S.A., Mexico City, Mexico

Filed Sept. 25, 1975, Ser. No. 616,694
Claims priority, application Mexico, Mar. 12, 1975, 157111
Int. Cl.² A01C *23/02*
U.S. Cl. 111—7.1 4 Claims



1. An apparatus for injecting liquid into cultivated ground, comprising a container for containing liquid to be injected, said container being supported a short distance above the ground, a flexible tube having first and second ends of which the first is connected to the container for drawing off liquid therefrom, and a unitary rigid tube having first and second ends and having at its first end a pointed head member of larger external diameter than the rigid tube to facilitate insertion of the rigid tube into the ground and also having near the pointed head member a plurality of perforations to enable liquid in the interior of the rigid tube to enter the ground in the region of the pointed head member when the rigid tube is inserted in the ground, and the apparatus also comprising a connection member threadedly securing the second end of the flexible tube to the second end of the rigid tube and being removable from the rigid tube to afford access to the interior thereof, a bag having a rigid perforated cap and a pervious wall and containing fertilizer or conditioner and being adapted to be inserted in the interior of the rigid tube when the connecting member is removed therefrom and to be retained in the rigid tube with the perforated cap under the connecting member when the connecting member is replaced, and regulating means to control flow of liquid from the container to the interior of the rigid tube by way of the flexible tube and the connection member.

4,031,834

GRAIN DRILL WITH DISK BIASING MEANS

Richard J. Klenke, Spearville, Kans., assignor to American Products, Inc., Spearville, Kans.

Filed Sept. 8, 1975, Ser. No. 611,022
Int. Cl.² F23B *1/00*
U.S. Cl. 111—85 1 Claim

1. In a grain drill having a frame with a seed hopper mounted thereon, a seed tube suspended from the bottom of the hopper for feeding seed from the hopper into the ground surface, gauge wheels rotatably mounted on the front of the drill frame, press wheels rotatably mounted on the rear of the drill frame, and an elongated horizontally mounted frame bar, attached to the frame, the frame bar positioned transverse to the direction of the movement of the grain drill, the improvement comprising:

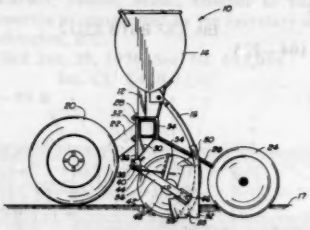
a disk bracket attached to and suspended downwardly from the frame bar;

a disk arm having a first end portion, a second end portion and a center portion, the first end portion of said disk arm pivotally mounted to said disk bracket;

a disk rotatably mounted to the center of said disk arm;

a disk boot attached to the second end portion of said disk arm, said boot having a side portion disposed against the side of said disk, the seed tube disposed between said disk and said disk boot; and

biasing means attached to said disk arm for urging said disk into the ground surface; said biasing means is a coil spring; said coil spring including a first end portion, a second end portion, and a coiled center portion, the first end portion and the coiled center portion mounted on said disk bracket, said improved grain drill further including an adjustable spring tension arm integrally attached to said disk arm, said tension arm receiving the second end portion of said coil spring thereon for adjusting the tension on said disk arm and urging said disk into the ground surface; said disk bracket including



a first end portion bolted to the frame bar, and a second end portion having a U-shaped arm with an arm shaft mounted therebetween, said first end portion of said disk arm having a bushing pivotally mounted on said arm shaft of said disk bracket; the coiled center portion of said coil spring is received around a first end portion of said bushing, the first end portion of said coil spring held against the U-shaped arm of said disk bracket; said improved grain drill further including a second coil spring having a first end portion, a second end portion, and a coiled center portion, the coiled center portion of said second coil spring received around a second end portion of said bushing, the first end portion of said second spring held against the U-shaped arm of said disk bracket, the second end portion of said second coil spring disposed against said adjustable spring tension arm thereby applying additional tension to said disk arm and urging said disk into the ground surface.

4,031,835

DEVICE FOR CLAMPING THE WORKPIECE IN A SEWING MACHINE

Andrew John Gilbride, Swampscott, and John Frederick Martin, South Essex, both of Mass., assignors to USM Corporation, Boston, Mass.

Filed May 7, 1976, Ser. No. 684,161
Int. Cl.² D05B *3/00*
U.S. Cl. 112—76 14 Claims

1. In a bar tacker sewing machine having means to secure the workpiece for movement through a predetermined pattern under the stitching instruments of the sewing machine, a workpiece clamp comprising:

A. a lower clamping element operatively connected to the sewing machine for movement through the predetermined pattern;

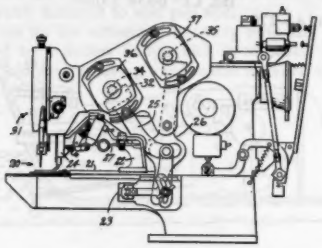
B. a support arm fixed to the lower clamping element and extending under the stitching instruments of the sewing machine;

C. an upper clamping element mounted on the support arm for movement into and out of clamping engagement with the lower clamping element;

D. biasing means resiliently forcing the upper clamping

element into clamping engagement with the lower clamping element;

E. remotely actuatable means mounted on the support arm and operatively connected to the upper clamping element



to cause movement thereof against the biasing means to release the workpiece; and,

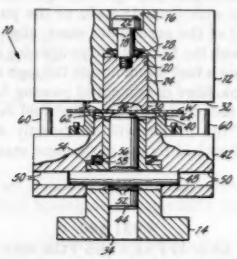
F. electrically operated control means to cause actuation of the workpiece release means.

4,031,836

MACHINE FOR MAKING CAN ENDS HAVING RUPTURABLE CLOSURES

Frederick Gerard Joseph Grise, 87 Main St., Osterville, Mass. 02655, and Walter Carl Lovell, 348 Mountain Road, Wilbraham, Mass. 01095

Filed Apr. 16, 1976, Ser. No. 677,798
Int. Cl.² B21D *51/44*
U.S. Cl. 113—1 F **8 Claims**



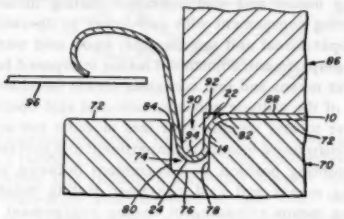
1. A punch press cyclically operable on sheet metal blanks for making container ends respectively including a disruptible closure comprising, an upper die holder relatively movable toward and from a swaging die along a common axis, a spring-backed upper forming die carried by said holder for movement along said axis and having a projecting closure-defining surface, a spring-backed coining tool telescoped on the swaging die for yielding movement between axial limits, a lower forming die coupled to the coining tool, stop means for determining the limit of approach between the upper die holder and the coining tool, a stripper mounted on the coining tool, and power means for causing the upper die holder to force the upper forming die against a blank on the stripper and into cooperative relation with the lower forming die whereby the periphery of the end closure is formed and, as the limit of approach is about to be determined by said stop means, to cause the coining tool to produce a line of weakening along at least a portion of said formed periphery, the springbacking of the upper forming die providing a greater resistance to unit load than the spring-backing of the coining tool so that bottoming of the upper forming die permits the loaded swaging die to cooperate with said projecting surface to radially dilate the closure periphery adjacent to said line of weakening, and thereafter relative retraction of the upper die holder in the operating cycle permits the still loaded coining tool to be de-energized and cooperate with said closure-defining surface of the upper forming die to tend to lock said dilated periphery to the remainder of the blank.

4,031,837

METHOD OF REFORMING A CAN END

Charles L. Jordan, Upper Burrell Township, Westmoreland County, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed May 21, 1976, Ser. No. 688,583
Int. Cl.² B21D *51/44*
U.S. Cl. 113—121 C **10 Claims**



1. A method for reforming a metallic can end to increase the can end's buckle resistance, comprising the steps of:

providing a sheet metal can end having a substantially planar center wall, an annular groove around said center wall bounded on the inside by an integral inner wall and on the outside by an integral chuckwall, a first curved portion between said center wall and said inner wall, a second curved portion at the bottom of said annular groove between said inner wall and said chuckwall, a peripheral flange extending radially outwardly from said chuckwall for securement of said can end to a container, and exterior and interior surfaces with respect to the exterior and interior of a container when said can end is secured thereon;

supporting said center wall of said can end against the interior surface thereof; and

reforming said can end by moving a drawing means into said groove and against the exterior surface of the second curved portion, while supporting the interior surface of the center wall to deepen said annular groove with respect to said center wall and reduce the radius of curvature of said second curved portion.

4,031,838

MODULAR INTERCHANGEABLE WEAPONS SUB-ASSEMBLY SYSTEM FOR WARSHIPS

Willy Schmidt, Ellerbek, Kr Pinneberg, and Karl-Otto Sadler, Hamburg, both of Germany, assignors to Blohm & Voss AG, Hamburg, Germany

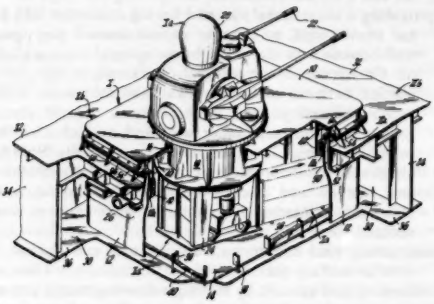
Continuation-in-part of Ser. No. 521,083, Nov. 5, 1974, abandoned, which is a continuation of Ser. No. 399,245, Sept. 20, 1973, abandoned, which is a continuation of Ser. No. 198,510, Nov. 15, 1971, abandoned. This application Dec. 24, 1975, Ser. No. 644,316

Claims priority, application Germany, Nov. 14, 1970, 2056069

Int. Cl.² B63G *1/00*
U.S. Cl. 114—1 **7 Claims**

1. A containerized modular assembly particularly for interchangeable mounting of operational units on warships by remote prefabrication of said operational units into operational unit sub-assemblies capable of interchangeable mounting upon said warship by standardized uniformly configured mating means, said assembly comprising: an operational unit; container means having said operational unit mounted therein in a manner to enable functioning interconnection of said

operational unit with said warship when mounted thereon; said operational unit and said container means being structurally combined as a unitary prefabricated modular operational unit sub-assembly; means defining on said warship a compartment adapted to receive therein said modular operational unit sub-assembly; adapter means including portions thereof defining adapter mating means formed of a standardized predetermined size and configuration, said adapter means being structurally formed as a part of said warship to define an opening for said compartment; container mating means formed from parts of said container means with a standardized predetermind size and configuration complementary to the size and configuration of said adapter mating means; said adapter mating means and said container mating means being in mounting engagement with each other to operatively mount said operational unit sub-assembly upon said warship within said compartment; adjustment means interposed between said adapter means and said container means for enabling adjustment of the attitude and orientation of said operational unit relative to said warship after said modular sub-assembly has been introduced into said compartment and movably arranged in mounting position by engagement between said adapter mating means and said container mating means; resilient sealing means extending in sealing engagement completely around said container means between said adapter mating



means and said container mating means to form a fluid-tight seal therebetween; and means for enabling application of said sealing means to effect said fluid-tight seal after said operational unit sub-assembly has had its attitude and orientation relative to said warship adjusted by operation of said adjustment means; said assembly further including means for enabling separation of said sealing means from between said adapter means and said container mating means to permit dismounting of said operational unit sub-assembly from said warship and mounting in the place thereof of another prefabricated modular operational unit sub-assembly having container means with substantially identical standardized container mating means, said adapter mating means and said container mating means each including complementary rims forming an annular gap therebetween which extends completely around said container means and which is adapted to receive therein said resilient sealing means, said assembly further including a stopper strip in abutting relationship between said adapter mating means and said container mating means closing off the innermost side of said annular gap, said container mating means having formed therein orifice means spaced around said container means in flow communication with said annular gap on the outermost side thereof to enable pouring therethrough of said sealing means while in liquid form to fill said annular gap. --

4,031,839

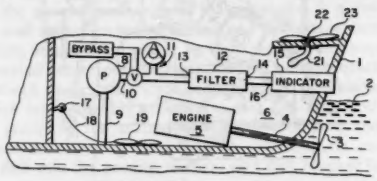
REUSABLE OIL ABSORBENT BILGE AND FUEL TANK OPENING PADS

Vito S. Pedone, Box 2733, Arlington, Va. 22202

Filed May 19, 1976, Ser. No. 687,942

Int. Cl.² B63B *35/00*

U.S. Cl. 114—270 **15 Claims**



1. A method for removing hydrocarbon oil and its products from the bilge of a boat having an internal combustion engine contaminating the bilge area with the hydrocarbon oil and products to avoid contaminating the environment of the boat with such products, comprising the steps of: containing a particulate mass of expanded open pore oleophilic and hydrophobic synthetic resin within a generally flat envelope of woven oleophilic and hydrophobic synthetic resin fibers having interstices between the fibers substantially smaller than the particules; placing the envelope and contained particle mass within the bilge area of the boat in contact with the oil and bilge water; passing the oil through the envelope with a wicking action and absorbing the oil with the particulate mass within the envelope while generally preventing passage of water through the envelope to its interior; providing a generally centrally arranged passage through the envelope and particulate mass with the side walls of the passage sealed to prevent removal of the particulate mass; aligning the passage concentrically with the fuel tank filler opening of the boat, and thereafter placing a fuel filling nozzle through the passage and into the fuel tank filler opening and passing fuel through the nozzle into the fuel tank so that spilled fuel during filling and withdrawing of the nozzle will be directly engaged by the envelope and absorbed by the particulate mass.

4,031,840

PROCESS AND APPARATUS FOR RECOVERING SUNKEN WRECKS

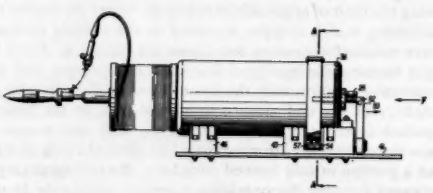
Gerald Marc Albert Boisrayon, Clamart, and Gilbert Marius Henri Martin, La Seyne, both of France, assignors to Etat Francais, France

Filed Dec. 19, 1975, Ser. No. 642,591

Claims priority, application France, Jan. 24, 1975, 74.02195

Int. Cl.² B63C *7/02*

U.S. Cl. 114—51 **10 Claims**



1. An apparatus for recovering sunken wrecks from the water, said apparatus comprising:

a. a harpoon fastened to one end of a rope by means of a fastening part connected to the harpoon, said fastening part formed, at one end, as a male tip;

b. a submarine gun provided with a hull and adapted to be connected to a submarine vehicle;
c. a harpoon launching apparatus borne by said submarine gun, which comprises a float rigidly connected with a reel on which the other end of said rope is wound, both being removably fastened to said gun and;
d. a device for the automatic fastening onto said male tip, formed by a hollow body which is threaded over said rope, said device having a pull cable fastened thereto.

4,031,841

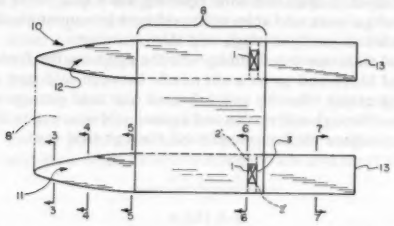
CONTROLLED AIR FILM HULL FOR WATERCRAFT

Mainhardt Bredt, New Orleans, La., assignor to Bredt-Kat, Inc., New Orleans, La.

Continuation-in-part of Ser. No. 419,087, Nov. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 875,430, May 25, 1970, abandoned. This application June 30, 1975, Ser. No. 592,042

Int. Cl.² B63B *1/38*

U.S. Cl. 114—67 A **18 Claims**



1. A watercraft of the step-lift planing type comprising:
at least one hull having an intermediate step-lift at its bottom;
an at least generally flat bottom hull portion aft of the step-lift, the underside of which is at least generally parallel to the water level;
air channel means extending through the hull to and communicating with the step-lift area through an opening for producing an air stream vacuum break at the step-lift and a thin, substantially non-propulsive, relatively low pressure and velocity air film along substantially all of the bottom of the aft hull portion, said air channel means being substantially free of any mechanical pressure inducing means;
retaining means comprising a pair of elongated, relatively narrow, edge protrusions located along each port and starboard edge of the hull at the bottom thereof and extended aft at least generally parallel to the hull and at least generally parallel each to the other from the step-lift area to the stern, the lower tip of each edge protrusion extending vertically downward beyond the bottom of said flat hull portion a very short distance to contact the surface of the water when the watercraft if underway and on plane, said retaining means and said bottom hull portion forming aft hull air film confining means to retain said thin film of air beneath substantially all the entire area of the hull aft the step-lift, said film of air being confined above by the bottom of said aft hull portion, confined below by the surface of the water, and confined laterally by the said pair of elongated protrusions, but having unimpeded egress at the stern.

4,031,842

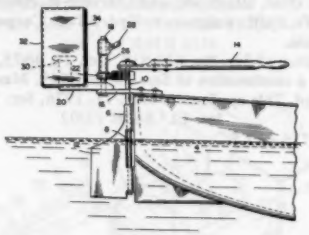
BOAT STEERING APPARATUS

Alden H. Simpson, 54 Pine Grove St., Springfield, Mass. 01110

Filed Apr. 26, 1976, Ser. No. 680,148

Int. Cl.² B63H *25/52*

U.S. Cl. 114—144 C **1 Claim**



1. A self steering apparatus for a sailing craft and the like comprising a rudder and rudder post, a tiller mounted on said post for guiding said rudder, a stationary support member extending rearwardly and outboard of said craft through which said rudder post extends, a shaft extending through the support member, a beam mounted on said support and said shaft and being pivotal on the shaft, said shaft being in geared connection with said rudder post as an alternative guide for said rudder, and a pair of spaced fins secured to the pivotal beam respectively on opposed sides thereof and being forwardly and inwardly inclined to one another whereby said beam is moved in accordance with the relative wind forces on each side of the fins.

4,031,843

DEVICE FOR CONNECTING A BARGE AND A PUSHER

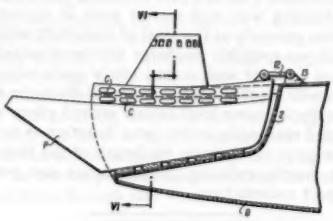
Jean-Paul Colin, Loire-Atlantique, France, assignor to Ateliers et Chantiers de Bretagne – A.C.B., Loire-Atlantique, France

Continuation-in-part of Ser. No. 385,577, Aug. 3, 1973, abandoned, which is a continuation of Ser. No. 575,234, May 7, 1975. This application Jan. 9, 1975, Ser. No. 539,831

Claims priority, application France, Aug. 9, 1972, 72.28708; Jan. 16, 1974, 74.01415

Int. Cl.² B63B *21/56, 35/70*

U.S. Cl. 114—247 **3 Claims**



1. In a system for interconnecting a barge and a pusher tug, having the stern of the barge complementary with the bow of the pusher tug, a longitudinal groove in the stern part of the barge, said groove having a section of substantially inverted T form in transverse cross-section to which the bow of said pusher tug conforms with clearance when the tug and the barge are brought together, a rigid thrust transmitting passive member attached at one end to said pusher tug and at the other end to the stern of said barge so as to transmit longitudinal forces and not forces at right angles to the longitudinal axis of the combined barge and pusher tug, expansible hydraulic compression members in the groove for interconnecting said bow and said stern, a pressure accumulator in fluid communi-

cation with said members, and means for expanding said expansible members after the tug and the barge have been interconnected by said thrust transmitting member.

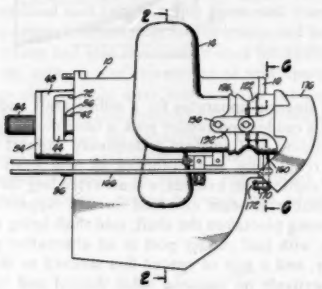
4,031,844
DUAL JET BOAT PUMP

Hasan F. Onal, Oceanside, and Clarence R. Harmon, Rancho Sante Fe, Calif., assignors to Hydro-Tech Corporation, Denver, Colo.

Continuation of Ser. No. 621,818, Oct. 14, 1975, abandoned, which is a continuation of Ser. No. 447,749, March 4, 1974, abandoned. This application Mar. 11, 1976, Ser. No. 665,908

Int. Cl.² B63H *11/02*

U.S. Cl. 115—12 R **5 Claims**



1. A pump for propelling a boat, comprising:
a pump housing having a central impeller cavity;
inlet passage means communicating with the said impeller cavity;
a substantially horizontal pump shaft extending centrally through and being rotatably mounted in said housing;
an impeller positioned within said impeller cavity and fixed to rotate with said shaft;
dual discharge volutes communicating with said impeller cavity, said dual volutes extending about said central impeller cavity and terminating laterally at opposite sides and at the level of said shaft;
a pair of elbows associated respectively one with each of said dual volutes and each having a first part formed by an end of a volute, and each one of said elbows including a bend to have a second part extending rearwardly beside said housing with said second parts in spaced parallel relation generally at the level of said shaft; and
a pair of non-rotatable discharge nozzles mounted directly one on each of said second elbow parts adjacent said bends with the discharge ends of said discharge nozzles at generally the same level as said second elbow parts and directed rearwardly in the same direction as said second elbow parts to minimize the length of the fluid confinement thereby reducing friction losses and providing a compact construction.

4,031,845
SLIT NOZZLE SOUND SIGNAL GENERATOR

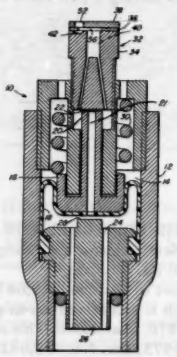
Edward J. Cook, South Hamilton, Mass., assignor to Safety Research & Engineering Corporation, North Reading, Mass.

Filed Apr. 29, 1976, Ser. No. 681,537

Int. Cl.² B60C *23/02;* **G10K** *10/00*

U.S. Cl. 116—34 R **12 Claims**

1. A sound generator actuated by a flow of gas, comprising
a. a block, a shim and a cover assembled in superimposed relation,
b. said block being formed with a flat face and a passage terminating at said face in a port located inwardly from the edges of said face and adapted to be connected to a source of compressed gas,
c. said block being formed with at least one cavity in said face located inwardly from the edges of said face and spaced from said port,
d. said shim being formed with an elongated opening of a length adapted to extend between said port and said cavity when said shim is in position over said face,
e. said shim being formed with an interaction edge at one end of said shim opening, said interaction edge extending transversely across the mid-portion of said cavity,



f. said cover being formed with a flat face and at least one opening discharge vent in said face, said cover face adapted to span said shim opening when said cover is in position over said shim with said vent in communication with said cavity through said shim opening,
g. said shim opening defining with the opposing flat faces of said block and cover a slit nozzle between said port and said cavity whereby gas delivered into said passage will flow through said nozzle and against said interaction edge to produce oscilations released through said vent.

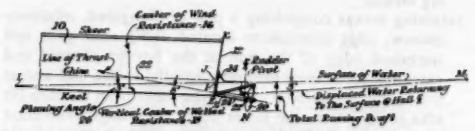
4,031,846
ANTI-CAVITATION SHROUD AND RUDDER

John W. Tone, 2601 Foulk Road, Wilmington, Del. 19810

Filed Oct. 9, 1975, Ser. No. 620,939

Int. Cl.² B63H *5/16*

U.S. Cl. 115—39 **19 Claims**

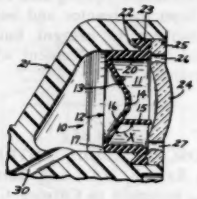


1. A shroud adapted to be mounted at the rear transom of a boat having a propeller, said propeller defining a propeller disc and a plane of revolution, a propeller shaft extending through said transom, a keel, and a hull having a planing center of resistance; said shroud extending rearwardly of said boat and being of expanding arcuate shape encompassing only the upper portion of said propeller disc and extending forwardly of said plane of revolution to said transom and rearwardly of said plane of revolution.

4,031,847
PRESSURE RATIO REVERSAL INDICATOR

Bruce M. Sullivan, Burnsville, Minn., assignor to Donaldson Company, Inc., Minneapolis, Minn.

Filed Apr. 21, 1976, Ser. No. 679,064
Int. Cl.² G08B 5/06
U.S. Cl. 116—65 **9 Claims**

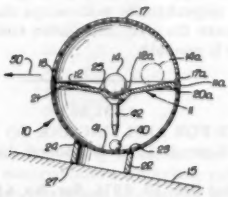


1. A generally cup-shaped indicator element of resilient, air impermeable material comprising:
   a tubular wall member
   a slack diaphragm closing one end of said member and movable into either an inward or an outward position with respect thereto, said diaphragm having an inner surface which is convex in said inward position of said diaphragm and concave in said outward position of said diaphragm;
   a limited central area of augmented visibility on said inner surface of said diaphragm;
   and an opaque tongue integral with said diaphragm, wider and longer than said central area, and extending from said inner surface, at an oblique angle with respect thereto, at a location spaced from said tubular member and said central area,
   so that in said outward position of said diaphragm said tongue overhangs and conceals said area, while in said inward position of said diaphragm said tongue exposes said area, when viewed looking toward said inner surface.

4,031,848
INERTIAL PERFORMANCE INDICATOR

Robert H. Killen, Pasadena, Calif., assignor to Wayne D. Stelmle, Arcadia, Calif.

Filed Mar. 17, 1976, Ser. No. 667,487
Int. Cl.² G01P 15/02
U.S. Cl. 116—114 AH **8 Claims**

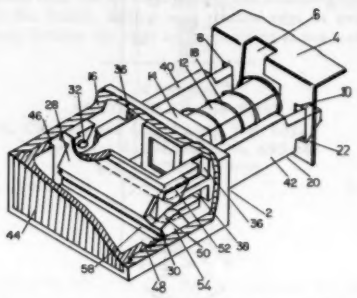


1. An inertial performance indicator, comprising
   a. a carrier having a downwardly dished upper surface,
   b. a first ball supported on said surface in a rest position, the ball adapted to be bodily displaced out of said rest position in response to predetermined acceleration of the carrier in a generally horizontal direction, and
   c. means to adjustably support and level said carrier so that said upper surface is approximately level relative to horizontal, said means including ball and socket joint elements forming a universal joint below the level of the carrier,
   e. said means including a leveling ball rollably supported on a downwardly dished interior surface associated with the lower hemisphere, there being a pointer integral with the carrier and projecting downwardly therefrom to point toward the leveling ball.

4,031,849
PUSH BUTTON SWITCH POSITION INDICATOR

Girishkumar Ratilal Mehta, Bombay, India, assignor to Mehta Engineering Enterprise, Maharashtra, India

Filed June 18, 1975, Ser. No. 587,804
Int. Cl.² H01H 9/16
U.S. Cl. 116—124 L **6 Claims**



1. A push button switch indicator (2) having a longitudinal axis comprising:
   a. a push button head (16) having a window fitted with a transparent cap (44) and a carrier (20) detachably mounted to switch frame means (4), said carrier being mounted in said head for longitudinal movement towards and away from said window while said head is maintained longitudinally by spring means (18) relative to said carrier and said frame means;
   b. said carrier having a front end whereon a signal surface (56) is provided and a pair of limbs (40, 42) extending longitudinally towards the rear end of said carrier;
   c. at least one shutter means (28, 30);
   d. first attaching means (32, 34; 36, 38; 52, 54) provided on said carrier for mounting on the latter said shutter means at said front end of the carrier so that said shutter means is rotatable about bearing means forming an axis perpendicular to the longitudinal axis;
   e. first operating cam means (46, 48) provided on said cap and co-acting with said first attaching means for operating the latter so that, on moving said head relative to said carrier, said shutter means pivotally moves into its "on" or first position for providing visual detection of said surface through said window; and
   f. second operating cam means (58, 60) provided on said head and co-acting with said first attaching means for operating the latter so that, on moving said head relative to said carrier, said shutter means pivotally moves into its "off" or second position for preventing the detection of said surface through said window.

4,031,850
SCHEDULE AND RECORD INDICATOR

Everett E. Gantt, Gadsden, Ala., assignor to Sports Guides, Inc., Gadsden, Ala.

Filed Jan. 27, 1976, Ser. No. 652,813
Int. Cl.² G09F 9/00
U.S. Cl. 116—135 **8 Claims**

1. A schedule and record indicator for keeping abreast of future scheduled events and also past records of the same opponents comprising; a sleeve member having two rectangular flat sides, said flat sides being integral with each other along the longitudinal edges thereof to form a pocket therebetween, a third flat rectangular member slightly smaller in width than the width of the sleeve member and slidable within

said sleeve member, window means in at least one of the flat sides of the sleeve, and means for frictionally retaining the slidable third member in an adjusted indicating position within the sleeve, and the means for frictionally retaining said third member in proper adjustment within the sleeve including a

number of spaced holes along one edge of one side of said sleeve and an indicator portion along one edge of the third slidable member and in alignment with said spaced holes so that the third member may be properly adjuted by reference to the indicator portion as viewed through the holes.

4,031,851

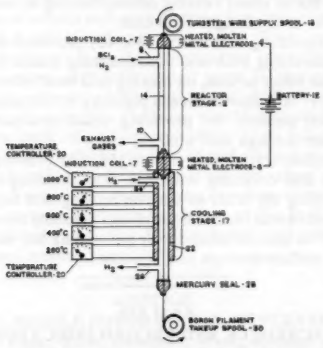
APPARATUS FOR PRODUCING IMPROVED HIGH STRENGTH FILAMENTS

Jose L. Camahort, 10 Fernwood Rd., Acton, Mass. 01720

Continuation-in-part of Ser. No. 386,691, Aug. 8, 1973, abandoned. This application Apr. 18, 1974, Ser. No. 462,073

Int. Cl.² C23C *13/02*

U.S. Cl. 118—49.1 **6 Claims**



1. A vapor deposition apparatus for forming composite, high strength filaments having a core material and a sheath material, comprising:

a. a reactor, including:

1. a reaction zone;
2. means for directing said core material through said reaction zone;
3. means to seal said reaction zone at its entrance end;
4. means to seal said reaction zone at its exit end, said means to seal comprising an inert, low-melting, high-boiling metal;
5. means to introduce a gaseous source of sheath material of boron to said reaction zone;
6. means to exhaust reaction gases from said reaction zone;
7. means to selectively heat said core to a temperature at least equal to the temperature at which the sheath material deposits onto the core material.

b. means for controllably cooling said composite material after it exits from the reactor and before it enters the ambient atmosphere to prevent buildup of internal stresses in said composite filament which substantially diminish its strength.

4,031,852

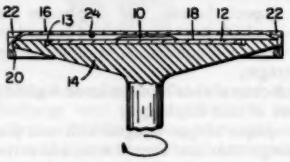
MICROSCOPE SLIDE CENTRIFUGE

Louis W. Clarke, Raleigh, N.C., and Burton H. Sage, Jr., Medfield, Mass., assignors to Corning Glass Works, Corning, N.Y.

Filed Jan. 2, 1976, Ser. No. 645,948

Int. Cl.² B05C *11/08*

U.S. Cl. 118—52 **3 Claims**



1. An apparatus for preparing blood films on a microscope slide comprising

a centrifuge including a platen having at least one surface suitable for accepting a microscope slide for spinning said microscope slide with a flat surface thereof perpendicular to the spin axis of the platen,

an enclosure having a broad flat interior surface closely disposed adjacent said flat microscope slide surface and parallel therewith a distance of up to about 0.3 inches, said enclosure closely surrounding said platen and substantially totally enclosing said microscope slide and said one surface of said platen,

means for firmly attaching said enclosure to said platen, and

means for spinning said platen and said enclosure together as one whereby due to said close disposition of the enclosure with respect to the microscope slide and platen, air flow between the slide and platen combination and the enclosure is minimal.

4,031,853

DEVICE FOR APPLYING INK TO A RIBBON

Raymond L. Conrad, 1598 W. Burrel Ave., Visalia, Calif. 93277

Filed Feb. 17, 1976, Ser. No. 658,585

Int. Cl.² B05C *11/00*

U.S. Cl. 118—264 **1 Claim**

1. A device for applying liquid ink to a ribbon for a typewriter comprising:

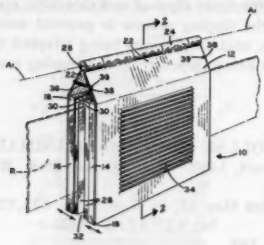
A. a case of a substantially planar configuration including a pair of opposed case halves, each case half being characterized by an endless lip projected from the periphery thereof for defining in said case a pair of pad cavities;

B. a pair of ink absorbent pads each being seated in a pad cavity and characterized by a face of a substantially planar configuration;

C. hinge means interconnecting said case halves for pivotal displacement about a common axis including a linear hinge member extended in spaced relation with adjacent edge portions of said case halves;

D. means for continuously urging the case halves in pivotal displacement for positioning the face of each pad of said pair of pads in an opposed relationship with the face of the other pad of the pair; and

E. stop means for limiting the pivotal displacement of said



case halves about said axis including stop means comprising a linear protuberance projected from one edge surface of the face of each pad of said pair of pads and extended in spaced parallelism with said axis for engaging the protuberance projected from the face of the other pad of the pair as the case halves are pivotally displaced.

4,031,854

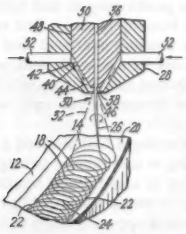
APPARATUS FOR COATING ARTICLES WITH ADHESIVE

Gordon V. Sprague, Jr., Danvers, Mass., assignor to USM Corporation, Boston, Mass.

Division of Ser. No. 417,352, Nov. 19, 1975, Pat. No. 3,911,173, which is a continuation-in-part of Ser. No. 329,362, Feb. 5, 1973, abandoned. This application Oct. 1, 1975, Ser. No. 618,484

Int. Cl.[2] B05C 5/00

U.S. Cl. 118—641 4 Claims



1. Apparatus for depositing a hot molten thermoplastic resinous adhesive material onto a workpiece surface as a band of overlapping loops comprising an applying nozzle having an extrusion orifice at one end thereof, supply means connected to said nozzle for forcing said material through said orifice to form a thin filament for deposition on said surface, air supply means for directing a stream of air around said filaments, said air supply means being constructed and arranged to impart to said stream of air a component in the direction of said work surface for attenuating said filament and a rotational component for moving said filament in a circular path to generate a substantially conical envelope terminating on said workpiece surface, and means for causing relative movement between said nozzle and said workpiece surface in a predetermined path at substantially right angles to said conical envelope, said nozzle and said workpiece being spaced from one another a direct distance predetermined to deposit said material on said surface as a band of overlapping loops.

4,031,855

ARTIFICIAL INSEMINATION OF SHRIMP

Harvey O. Persyn, Crystal River, Fla., assignor to Ralston Purina Company, St. Louis, Mo.

Filed June 23, 1976, Ser. No. 699,142

Int. Cl.[2] A01K 61/00

U.S. Cl. 119—2 11 Claims

1. A method of promoting the fertilization of shrimp eggs comprising selecting female shrimp with mature eggs or ovaries and male shrimp with a mature spermatophore, removing the spermatophore from the male shrimp, extracting the sperm mass from the spermatophore, and attaching the sperm mass to the female shrimp with mature eggs or ovaries to effectively fertilize the eggs upon spawning in sea water.

4,031,856

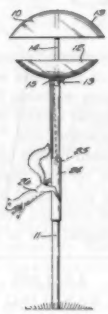
SQUIRREL-PROOF POST

Russell L. Chester, Box 42, Fontana, Wis. 53125

Filed June 4, 1976, Ser. No. 693,045

Int. Cl.[2] A01K 29/00

U.S. Cl. 119—51 R 9 Claims



1. A squirrel-proof post comprising a post adapted to support a bird platform at the top of the post, squirrel carrier means slidably related to the post for up and down movement with respect to the post, said squirrel carrier means being dimensioned to receive a squirrel which climbs onto the carrier means to transfer his weight from the post to the carrier means, and means biasing the carrier means toward the top of the post, the bias of said biasing means being insufficient to sustain the weight of a squirrel which has climbed up the post and onto the carrier means, whereupon the carrier means and squirrel will slide down the post to a position in which the squirrel is out of jumping range to the bird platform.

4,031,857

VOLUMETRIC ACCUMULATING DEVICE

Robert D. Jones, Oskaloosa, Iowa, assignor to Intraco, Inc., Oskaloosa, Iowa

Filed Mar. 15, 1976, Ser. No. 666,696

Int. Cl.[2] A01K 5/00

U.S. Cl. 119—56 R 6 Claims

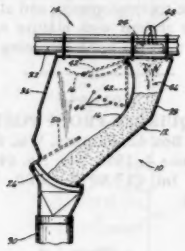
1. A volumetric accumulating device adapted to be connected to a conveyor system for receiving and holding a predetermined amount of granular or powdery material from the conveyor system, said device comprising:

a housing having two side walls and two end walls positioned therebetween, said housing adapted to be connected to the underside of the conveyor system, said housing including an upper portion adjacent to one of said end walls, said one end wall being spaced from the other end wall and including a portion converging downwardly toward the lower end of said housing and towards the other end wall thereby forming a discharge opening adjacent to said lower end and adjacent to said other end

wall, said upper portion including an inlet opening adapted to receive material therethrough;

means for selectively opening and closing said discharge opening;

metering means for selectively controlling the amount of material receivable within said housing, said means including a plate pivotally attached adjacent one end thereof to said housing and positioned transversely with respect to the sidewalls, the edges of said plate being complementary to the shape of the sidewalls whereby the



edges of the plate remain adjacent to the sidewalls during pivotal movement of the plate with respect to the sidewalls, said plate being movable between a vertically oriented position adjacent to said one end wall and a horizontally oriented position; and

an inlet opening disposed in said upper portion of the housing and adapted to receive material therethrough, said inlet opening being positioned directly above the downwardly inclined end wall and generally between said one end wall and the pivotal axis of said plate.

4,031,858

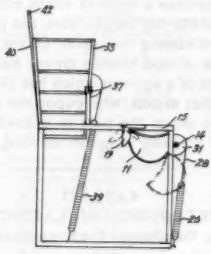
STOCK HANDLING DEVICE

Brian Mervyn Harrington, P.O. Box 43, Darkan, 6392, Australia

Filed Dec. 23, 1975, Ser. No. 643,942

Int. Cl.² A61D *3/00*

U.S. Cl. 119—103 **10 Claims**



1. A stock handling device comprising:

a. a cradle shaped to receive and support an animal in an inverted position, the cradle being pivotally mounted on a frame for rotation about a first substantially horizontal axis coinciding with one side of the cradle;

b. latching means mounted on the frame for holding the cradle in a horizontal position, the latching means being releasable to permit the cradle to rotate about the first horizontal axis to discharge the animal therefrom; and

c. animal tipping means rotatable on said frame and having an entry to receive an animal and capable of being rotated about a second substantially horizontal axis to an inverted position to discharge the animal into the cradle in an inverted position, the tipping means having two opposed side walls and a floor, one of said side walls being fixed lying adjacent the cradle, the other of said side walls being remote from the cradle and movable inwardly from an outermost position to clamp an animal within the tipping means against the one of said side walls during the rotation of the animal tipping means to a discharge position, said tipping means also being provided with gate means at the entry thereof and closeable upon an animal entering the tipping means to prevent animals backing therefrom, said gate means being adapted to open upon an animal being tipped from the tipping means.

4,031,859

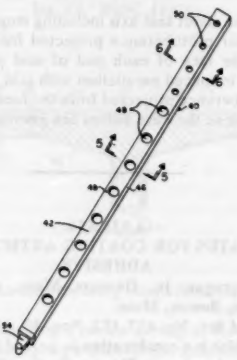
COLLAR FOR A SMALL ANIMAL

James P. Stewart, 14605 SE. Fairwood Blvd., Renton, Wash. 98055

Filed May 23, 1974, Ser. No. 472,733

Int. Cl.² A01K *27/00*

U.S. Cl. 119—106 **12 Claims**



1. A collar for a small animal, said collar comprising:

a. a tubular housing;

b. said tubular housing having a tubular passageway extending the entire length of said tubular housing;

c. an insert for positioning in said tubular passageway;

d. said tubular housing having a first end and a second end;

e. said tubular housing near said first end having a pair of opposing holes in the walls and which opposing holes connect with said tubular passageway;

f. said tubular housing near said second end having a tongue;

g. said tongue having a first end and a second end with said first end being in said tubular passageway and said tongue being secured to said tubular housing;

h. said tongue on said second end having opposed studs for mating with said opposing holes to form a collar from said tubular material; and,

i. said tubular housing being soft, flexible and resilient.

4,031,860

ARRANGEMENT FOR REDUCING THE NOX CONTENT OF FLUID GASES

Heinz Recht, Oberhausen, Rhld., Germany, assignor to Deutsche Babcock & Wilcox Aktiengesellschaft, Germany

Filed Feb. 2, 1976, Ser. No. 654,345

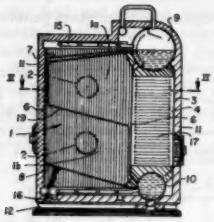
Claims priority, application Germany, Feb. 3, 1975, 2504418

Int. Cl.² F22B *31/04*

U.S. Cl. 122—240 B **7 Claims**

1. An arrangement for reducing the NO_x content in the flue gases of a single stage combustion boiler, with a combustion chamber defined by tubular water walls and having plural burners, fired by liquid or gaseous fuel, mounted through one wall, and communicating with a flue gas duct, separated from

the combustion chamber by a transition zone, through a combustion gas flow opening, adjacent a wall opposite the burner mounting wall, connecting the combustion chamber to the flue gas duct, said arrangement comprising at least one substantially gas-tight partition, formed of water tubes, extending in the axial direction of the burners completely across said combustion chamber between the water walls thereof and said



transition zone, and dividing said combustion chamber into sections each respective to a single burner and each communicating individually with said combustion gas flow opening; whereby the combustion gases, flowing through said sections from the respective burners to said combustion gas flow opening are in heat transfer contact with, and surrounded by, both the water walls of said combustion chamber and the water tubes of each said partition.

4,031,861

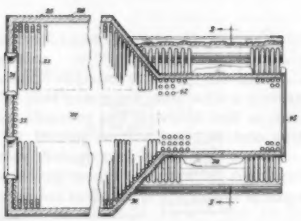
PULVERIZED COAL FIRED PACKAGE BOILER

William Hunter Pollock, East Granby, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 5, 1976, Ser. No. 673,498

Int. Cl.² F22B *21/14*

U.S. Cl. 122—327 **4 Claims**



1. A shop assembled boiler comprising an upper drum that extends horizontally to form an elongate ridge along the apex of a boiler, a pair of lower drums positioned under the upper drum and spaced apart to comprise a base for said boiler, a housing with a front and rear portion enclosing the boiler, a plurality of tubular members connecting each lower drum to the upper drum formed to provide an open furnace cavity in the front portion of the housing having a hopper shaped bottom with tubular walls on opposite sides of an elongate throat, a bank of closely spaced tubes in the rear portion of the boiler formed to extend vertically between the lower drums and the upper drum and adapted to intercept hot gases that have traversed the cavity in the front portion of the boiler furnace, and coal burning apparatus penetrating the front portion of the furnace to exhaust hot products of combustion into the furnace cavity.

4,031,862

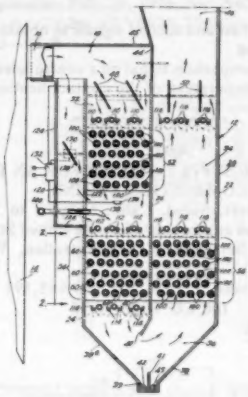
ECONOMIZER

Frank J. Smith, 7352 Limekiln Pike, Philadelphia, Pa. 19138

Filed Mar. 10, 1976, Ser. No. 665,501

Int. Cl.² F23J *3/02*; F22D *1/02*

U.S. Cl. 122—421 **8 Claims**



1. An economizer comprising a duct for conducting hot flue gases from a boiler to a stack, a plurality of parallel heat exchange tube assemblies disposed within said duct extending transversely to the flow of said flue gases, said tube assemblies each comprising an outer tube of a first material, an inner tube of a second material coaxially disposed in spaced relation within said outer tube, and an intermediate layer between said inner and outer tubes completely filling the space therebetween, a major portion of the composition of said intermediate layer comprising graphite or carbon, and means for connecting said inner tubes to a source of liquid to provide a flow of liquid through said tube assemblies to transfer heat energy from said flue gases to said liquid.

4,031,863

PROCESS AND A CONTROL SYSTEM FOR CONTROLLING THE EXIT TEMPERATURE OF VAPOR FLOWING THROUGH A CONTACT HEATING SURFACE OF A VAPOR GENERATOR

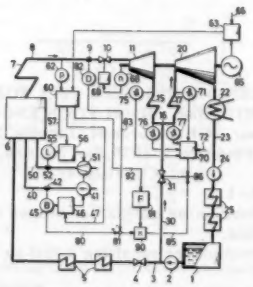
Fritz Läubli, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Sept. 26, 1975, Ser. No. 617,063

Claims priority, application Switzerland, Sept. 17, 1974, 12628/74

Int. Cl.² F22G *5/12*

U.S. Cl. 122—479 R **14 Claims**



1. A process for controlling the exit temperature of vapor

flowing through a contact heating surface of a vapor generator, said process comprising the steps of

obtaining a first signal corresponding to the amount of an instantaneous flow of heat supplied by a fuel delivered to the vapor generator;

obtaining a second signal corresponding to the quantity of vapor flowing momentarily through the contact heating surface;

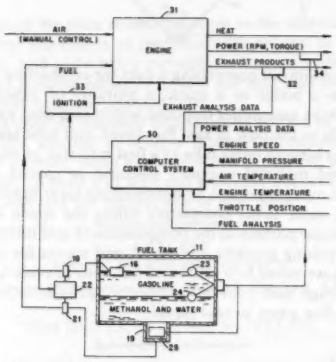
comparing said first and second signals to obtain a comparison signal; and

imposing said comparison signal on a control element acting on the exit temperature of the contact heating surface.

4,031,864
MULTIPLE FUEL SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

William T. Crothers, Sunol, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 9, 1976, Ser. No. 665,191
Int. Cl.² F02B *75/12*
U.S. Cl. 123—1 A **14 Claims**



1. A method for supplying a combustion engine with fuel from a multiple liquid fuel supply contained in a single container, said multiple liquid fuel being phase-separable to form a two-phase liquid, the upper phase containing a major proportion of a first component of the multiple fuel and the lower phase containing a major proportion of a second component of the multiple fuel, which comprises:

inducing phase separation of the multiple liquid fuel, thereby establishing the two-phase liquid in the container;

supplying the combustion engine with liquid selected from the group consisting of liquid withdrawn from the upper phase, liquid withdrawn from the lower phase, and liquid withdrawn from both the upper phase and the lower phase.

4,031,865
HYDROGEN-OXYGEN FUEL CELL FOR USE WITH INTERNAL COMBUSTION ENGINES

Patrick Dufour, 14 Hawthorne St., Laconia, N.H. 03246

Filed Oct. 1, 1975, Ser. No. 618,442
Int. Cl.² F02B *43/08*
U.S. Cl. 123—1 A **1 Claim**

1. In combination, an internal combustion engine having an intake manifold,

and a carburetor for supplying a fuel-air mixture to said engine,

a hydrogen and oxygen gas generator for supplying a hydrogen gas fuel supplement to said engine,

said gas generator comprising a cell containing water,

a negative and positive electrode extending into said water,

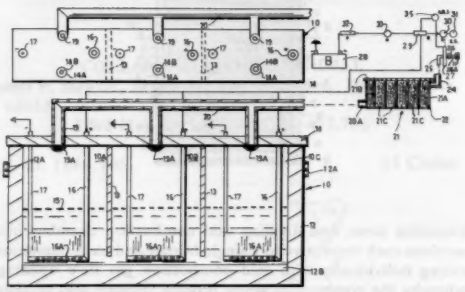
a catalyst of an alkaline base dispersed in said water,

an electrical D.C. power supply connected in circuit with said electrodes whereby hydrogen gas is generated when said electrodes are energized,

a rheostat switch in circuit with said power supply to control the rate of said hydrogen gas generator,

a dryer,

conduit means connecting the gases generated in said cell to said dryer,



means for directing the gases dried in said dryer to said intake manifold,

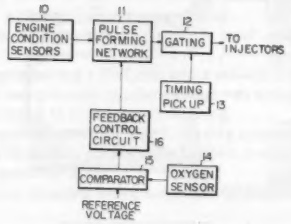
and accelerator means operatively connected to said rheostat switch for controlling the rate of gas generation in accordance to engine demand,

and wherein said positive electrode is perforated to permit the introduction of air into said cell to enhance liberation of the hydrogen gas forming at the negative electrode.

4,031,866
CLOSED LOOP ELECTRONIC FUEL INJECTION CONTROL UNIT

Masaharu Asano, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed July 23, 1975, Ser. No. 598,280
Claims priority, application Japan, July 24, 1974, 49-84960
Int. Cl.² F02B *3/00*
U.S. Cl. 123—32 EB **7 Claims**



1. An electronic fuel injection control unit for internal combustion engines including a fuel injecting device, comprising:

means including a composition sensor for sensing the concentration of the composition in the emissions from the engine and generating a correction signal at one of first and second discrete values depending upon whether the sensed concentration is above or below a predetermined value;

means for generating a train of clock pulses in step with each engine revolution;

means for counting the clock pulses to generate a first signal when the number of counted clock pulses reaches a predetermined value in the presence of the correction signal at the first discrete value and a second signal when the

number of the counted clock pulses reaches the predetermined value in the presence of the correction signal at the second discrete value;

a variable gain operational amplifier responsive to the correction signal to provide a gain-controlled signal and capable of providing different amplification in response to said first or second signal from the counting means;

means for generating first and second transient signals in response to the first and second signals, respectively, from said counting means, said transient signals having opposite polarities to the polarity of the gain-controlled signal and being combined therewith; and

a pulse forming network responsive to the combined signals to generate an injection pulse, the duration of which is dependent on the magnitude of the gain-controlled signal, said injection pulse being supplied to said fuel injecting device.

4,031,867

INTERNAL COMBUSTION ENGINE COMBUSTION PROCESS

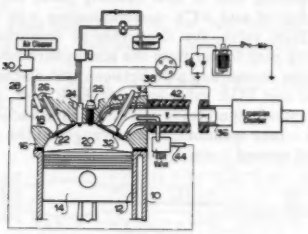
Hiroki Yasuda, Hachioji; Shuji Sawafuji, Musashino, and Hitoshi Suzuki, Chofu, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 18, 1975, Ser. No. 641,738

Claims priority, application Japan, Dec. 28, 1974, 50-3275

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 ST **8 Claims**



1. An internal combustion engine having at least one cylinder, comprising

a combustion chamber in each cylinder,

an intake port communicating with a corresponding combustion chamber and provided with an intake valve,

means for feeding air fuel mixture into said combustion chamber through said intake port,

injection nozzle means for supplying fuel into said combustion chamber in the form of droplets in suspension in said mixture,

a spark plug provided in said combustion chamber,

an exhaust valve operatively communicating with said combustion chamber,

an exhaust gas passage without a gas stagnating portion and communicating with said exhaust valve, and including a predetermined zone defining a volume, the latter extending from immediately adjacent said exhaust valve, said exhaust gas passage having an open end, and

heat insulation means in said predetermined zone immediately adjacent to said exhaust valve for preventing exhaust gas temperature in said predetermined zone from lowering below a predetermined temperature, the latter being a function of the volume of said predetermined zone with respect to engine displacement volume so as to cause sufficient self-reaction oxidation in said predetermined zone in order to have HC concentration below 10 ppm and CO concentration below 0.1 percent.

4,031,868

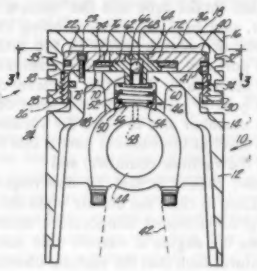
VARIABLE COMPRESSION RATIO PISTON

Albert M. Karaba, Muskegon; Alexander P. Brouwers, Bloomfield Hills, and Thomas J. Pearsall, Grand Haven, all of Mich., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 611,863, Sept. 10, 1975. This application Feb. 20, 1976, Ser. No. 659,727

Int. Cl.² F02B *75/04*

U.S. Cl. 123—78 B **10 Claims**



1. In an internal combustion engine, a piston having an inner member and an outer member telescopically received by said inner member, said members being movable in response to reciprocation of the piston with respect to a combustion chamber of the engine, a first fluid chamber and a second fluid chamber varying in volume in response to said relative movement and to variations in the quantity of fluid therein, means supplying fluid to said chambers, said means comprising a first passage in said piston connecting with said first fluid chamber, a one way inlet valve disposed in said first passage and a second passage in said piston connecting said first chamber with said second chamber, the improvement comprising a sealing groove in said inner member and a sealing member carried in said sealing groove, said second passage extending through said sealing groove and said sealing ring acting as a valve means to regulate fluid flow between said first and second chamber.

4,031,869

IGNITION-TIMING ADJUSTING SYSTEM FOR SPARK-IGNITION INTERNAL COMBUSTION ENGINES

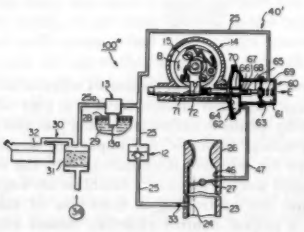
Takanori Onishi, and Ken Shiozawa, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jan. 20, 1975, Ser. No. 542,448

Claims priority, application Japan, Feb. 18, 1974, 49-018475

Int. Cl.² F02P *5/04*

U.S. Cl. 123—117 A **8 Claims**



1. An ignition timing control system for an internal combustion engine comprising:

an intake tube for delivering a combustible mixture to an engine and having a vacuum port in the wall of said tube;

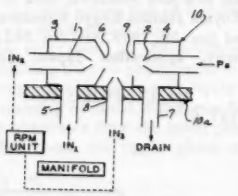
a throttle valve mounted in the intake tube;
an ignition timing means synchronized with the engine;
a vacuum actuator having a vacuum chamber and an actuator means connected to the ignition timing means for advancing the ignition timing of the engine in response to increasing vacuum level in the vacuum chamber;
a vacuum line connecting the vacuum chamber of said actuator to the vacuum port in the intake tube;
an air line between the vacuum chamber and the atmosphere;
first valve means in said vacuum line between the vacuum port of the intake tube and the vacuum chamber of the actuator, said first valve means being responsive to the difference in vacuum levels in the intake tube at the vacuum port and in the vacuum chamber of the actuator to open the vacuum line when the level of vacuum at the vacuum port is greater than the level of vacuum in the vacuum chamber and to close the vacuum line when the vacuum level at the vacuum port is less than the vacuum level in the vacuum chamber; and
second valve means in said air line responsive to engine temperature to close the air line when the engine is colder than a predetermined temperature and to open the air line when the engine is warmer than said predetermined temperature, such that the vacuum chamber of the actuator is exposed to the greatest level of vacuum at the vacuum port under all operating load conditions during cold engine operation and to atmospheric pressure when the engine is warmed up.

4,031,870

FUEL CHARGE INJECTION APPARATUS FOR INTERNAL COMBUSTION ENGINES

Shinji Ozawa, Kanagawa, Japan, assignor to Mikuni Kogyo Co., Ltd., Tokyo, Japan

Filed Mar. 20, 1975, Ser. No. 560,170
Int. Cl.² F02B *33/00*; F02M *7/00*; F02D *11/08*; F02M *17/02*
U.S. Cl. 123—119 R **12 Claims**



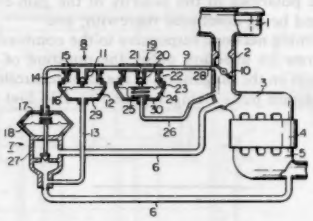
1. In a fuel charge injection apparatus wherein an impacting stream charge injection device having a pair of opposing stream forming means to define impacting fuel and air streams and having means to move the impacting stream position therebetween for selective introduction into the engine, and having a signal source means to establish an engine related control signal for controlling at least one of said streams, comprising a stream control chamber means enclosing the discharge end of one of said stream forming means and having an orifice aligned with said stream forming means, and a control signal port connected to said chamber to receive said engine related control signal and to control the strength of the corresponding stream.

4,031,871

EXHAUST GAS RECIRCULATION SYSTEM OF A MOTOR VEHICLE

Makio Hamanishi, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 27, 1976, Ser. No. 690,656
Claims priority, application Japan, Mar. 2, 1976, 51-21757
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **4 Claims**



1. In an exhaust gas recirculation system of a motor vehicle which comprises:
a diaphragm type EGR valve mounted on an EGR pipe which connects the exhaust manifold and the intake manifold;
an opening path for air from the atmosphere diverged from a connecting pipe which connects the diaphragm chamber of said EGR valve and the EGR port near the carburetor throttle valve, and;
a diaphragm type vacuum control valve (VCV) arranged at the opening end of said opening path, the diaphragm chamber of said VCV communicating with the inlet of said EGR valve, the improvement comprising another opening path for air from the atmosphere being diverged from the connecting pipe between said diaphragm chamber of said EGR valve and said EGR port, and another VCV, which operates in response to the vacuum pressure in the intake manifold, being arranged at the opening end of said second opening path.

4,031,872

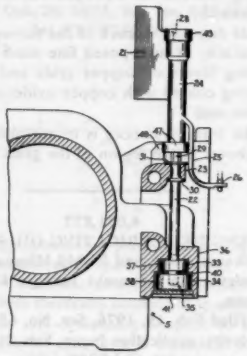
THERMOSTATIC AUTOMATIC CHOKE CONTROL FOR SMALL ENGINES

Robert G. Thompson, Milwaukee, and Heinz K. Gund, Brookfield, both of Wis., assignors to Briggs & Stratton Corporation, Wauwatosa, Wis.

Continuation-in-part of Ser. No. 516,641, Oct. 21, 1974, abandoned, which is a division of Ser. No. 417,402, Nov. 19, 1973, Pat. No. 3,863,614. This application Sept. 19, 1975, Ser. No. 614,891
Int. Cl.² F02B *33/00*
U.S. Cl. 123—119 F **10 Claims**

4. A control device wherein an imbalance between opposing forces acting on a movable control element urge the same in one or the other of two opposite directions with respect to a fixed element, depending upon the sense of the imbalance, characterized by:
A. a pair of thermostatic governor means to govern the response of said control element to the opposing forces acting thereon,
said pair of thermostatic governor means having responses of opposite sense to a change in ambient temperature; and
B. means operatively interposing said governor means between said control element and said fixed element in a manner such that each of the two governor means can govern response of said control element to the opposing forces acting thereon independently of the other,

whereby the two governor means can coact to govern the response of said control element to the opposing forces



acting thereon, over a wide temperature range without objectionably stressing either one of them.

4,031,873

FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES HAVING CONTROLLED EXHAUST GAS RECYCLING

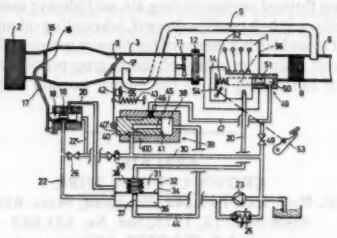
Werner Banzhaf, Sindelfingen; Gerhard Stumpp, Stuttgart-Vaihingen, and Gerhard Schielinsky, Schwaikheim, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed June 30, 1976, Ser. No. 701,160

Claims priority, application Germany, July 10, 1975, 2530777

Int. Cl.² F02M *25/06, 7/00;* **F02B** *31/00*

U.S. Cl. 123—119 A **16 Claims**



1. A fuel injection system for an internal combustion engine, comprising in combination:

a. a suction tube through which an air flow is established;

b. an exhaust gas line through which an exhaust gas flow is established;

c. an exhaust gas recycling line connected to the exhaust gas line and to the suction tube, the suction tube connection defining therein a discharge outlet of the recycling line;

d. a throttle valve controlling the flow of the exhaust gas in the recycling line, said throttle valve being mounted within the suction tube upstream of and in operative association with the discharge outlet of the recycling line;

e. air metering means mounted to partially extend into said suction tube and be displaceable by the air flow thereon;

f. fuel injection means including means for arbitrarily varying the fuel quantity delivered by the fuel injection means;

g. a servomotor including a displaceably mounted piston, a working chamber and means connecting the piston to the throttle valve for controlling the opening thereof;

h. means providing a variable restoring force against the displacements of the servomotor piston;

i. a differential pressure valve having an uncontrolled pressure chamber, a controlled outflow opening in a chamber having an essentially constant reference pressure, and means connecting the controlled outflow opening to the working chamber of the servomotor;

j. fuel metering means including a control slide connected to and displaceable by the air metering means, a throttle whose cross-section is varied by the displacements of the control slide, and means for establishing a regulatable, substantially constant return force acting against the displacements of the control slide; and

k. a fuel suction line connected to the fuel injection means, the uncontrolled pressure chamber of the differential pressure valve and, upstream of its connection to the uncontrolled pressure chamber, to the throttle whose cross-section is varied, wherein:

i. the arbitrarily varied fuel quantity serves as a reference parameter for the operation of the servomotor; and

ii. the servomotor piston is displaceable, against the variable restoring force, between two positions, one corresponding to a fully opened position of the throttle valve and closed exhaust gas recycling line, and the other corresponding to a substantially closed throttle valve.

4,031,874

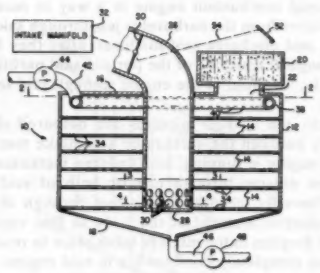
CARBURETOR

John E. Alwine, 4341 Willow Brook Ave., Apt. 102, Los Angeles, Calif. 90029

Filed Oct. 8, 1975, Ser. No. 620,843

Int. Cl.² F02M *17/22*

U.S. Cl. 123—134 **6 Claims**

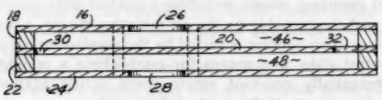


1. A carburetor for supplying a fuel mixture to an internal combustion engine including a closed hollow body, a series of closely perforated baffle plates extending between the side walls of the body and spaced apart between the top and bottom of the body, an air inlet opening in the body above the uppermost baffle plate, a fuel mixture pipe extending into the body through the top of the body, down through a number of baffle plates to an inlet opening located below a number of baffle plates, the portion of the baffle plate immediately above the inlet opening being imperforate adjacent the pipe to prevent excess liquid fuel from being drawn through such plate immediately adjacent the inlet opening, a fuel supply for distributing liquid fuel over the uppermost of said baffle plates so that when the engine is in operation liquid fuel and air are drawn down through the perforations in the baffle plates and the fuel is evaporated to form a gaseous fuel mixture subsequently drawn into the fuel mixture pipe through said inlet openings, the bottom of the body forming a sump for collection of excess liquid fuel and a return fuel system for flowing such liquid fuel away from the carburetor.

4,031,875
FUEL VAPORIZER

Darwin A. Tyler, 26054 East St. U12, Llano, Calif. 93544

Filed Sept. 15, 1975, Ser. No. 613,057
Int. Cl.² F02M 29/00
U.S. Cl. 123—141 5 Claims



1. Vaporizing means particularly adapted for use in converting wet mixtures of fuel and air from the jets of a carburetor for an internal combustion engine to substantially dry mixtures, said vaporizer means comprising:

a body formed of a thermally conductive material having a relatively flat elongate first internal chamber, a relatively flat, elongate second internal chamber in superposed relationship with the first internal chamber and a relatively thin partition separating the two chambers;

said body having a first opening into said first internal chamber and a second opening into said second internal chamber;

said partition having a first port interconnecting the first and second internal chambers and a second port interconnecting said chambers;

the first and second openings in said body being of equal size and shape and in peripheral and axial alignment, said first port being offset a first distance in one longitudinal direction from the aligned axes of said first and second openings, and said second port being offset a second distance in the opposite longitudinal direction from said axes;

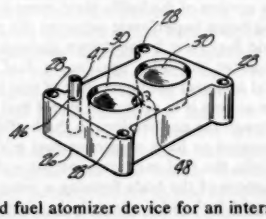
said body being sized and shaped, and its openings and chambers being positioned and otherwise adapted, to permit its interposition between said carburetor and said internal combustion engine in a way to receive air-fuel mixtures from the carburetor jets through said first opening, and discharge said mixtures, after they have passed through at least one of the ports in said partition, into the intake manifold of the engine through said second opening;

whereby the air-fuel mixtures are detoured through said body between the carburetor and intake manifold, when the engine is running, and undergo increases in velocity when passing through one or both of said ports and, additionally, absorb engine heat through the thermally conductive material of the body so that vaporization of fuel droplets in the mixture takes place to render said fuel more completely combustible in said engine.

4,031,876
FUEL ATOMIZER

Robert G. Hoots, 7427 Lawrence St., Grand Blanc, Mich. 49505

Continuation-in-part of Ser. No. 451,949, March 18, 1974.
This application July 7, 1975, Ser. No. 593,718
Int. Cl.² F02M 29/00
U.S. Cl. 123—141 7 Claims



1. A liquid fuel atomizer device for an internal combustion engine, comprising:

a. a base member having at least two throughbores formed therethrough and at least one internal transverse bore extending between the throughbores and in communication therewith,

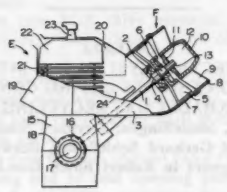
b. and grids disposed in each of the throughbores comprising a plurality of superposed fine mesh grids comprising alternating layers of copper grids and brass grids, the grids being coated with copper oxide and potassium dichromate, and

wherein the transverse bore is in communication with the throughbores in the region of the grids.

4,031,877
ENGINE LUBRICATING OIL PUMP

Tetsuzo Fujikawa, Kobe, and Kichiji Misawa, Akashi, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Feb. 19, 1976, Ser. No. 659,231
Claims priority, application Japan, Feb. 26, 1975, 50-27103
Int. Cl.² F02F 7/00
U.S. Cl. 123—195 A 5 Claims

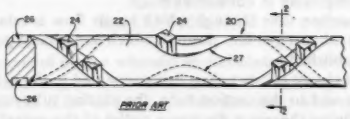


1. Internal combustion engine comprising an engine portion having a power output member, cooling blower means driven by said power output member of the engine portion for producing flow of engine cooling air, said blower means having fairing means at hub portion thereof, lubricating oil pump means disposed in said fairing means of the blower means and driven by said power output member of the engine portion to provide supply of lubricating oil to the engine portion as the engine rotates.

4,031,878
CROWN CUTTING WIRE

George H. Hall, P.O. Box 244, Westford, Mass. 01886

Filed Nov. 12, 1975, Ser. No. 631,083
Int. Cl.² B28D 1/08
U.S. Cl. 125—21 9 Claims



1. A wire saw comprising in combination:

an elongated flexible metallic body having a substantially circular cross section, a curved outer surface and, at least one helical ridge on said curved outer surface along the length of said body,

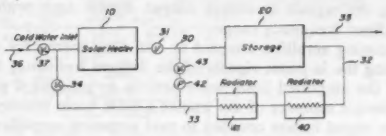
a plurality of blocks of composite comminuted abrasive in a bonding matrix resiliently mounted on said body along said at least one ridge in spaced-apart relation to one another;

the bottom surfaces of said blocks being shaped to substantially mate with said body outer surface.

4,031,879
SOLAR ENERGY CONVERSION PLANT

J. P. Parham, R.R. 2, Box 475, Melbourne, Fla. 32901

Filed Oct. 28, 1975, Ser. No. 625,856
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 7 Claims



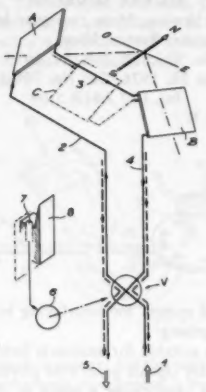
1. A solar energy conversion plant, comprising:
a solar radiation converter system including,
a solid radiation to heat converter, a plurality of heat exchange members thermally connected to said radiation to heat converter and a housing adapted to support said radiation converter and form a container for said heat exchange members wherethrough a heat absorbent fluid is circulated;
a fluid circulating system adapted to inject a heat absorptive fluid into said solar radiation converter system at a first temperature and extract said fluid from said system at a second temperature wherein said second temperature is greater than said first temperature;
a fluid storage means adapted to receive heated fluid from said solar radiation converter system, said receiving means including a one-way pressure valve adapted to permit fluid transfer from said radiation converter system to said storage means when the differential pressure therebetween exceeds a predetermined value;
heat radiation means adapted to receive heated fluid from said storage means;
means to return said fluid from said radiation means to said solar radiation converter system including a one-way valve;
a solar radiation converter system bypass connected between said radiation means return fluid line and said storage means, said interconnection to said storage means adapted to be downstream of said pressure valve;
a fluid pump in said bypass system; and
a one-way valve between said fluid pump and said storage means.

4,031,880
METHOD AND DEVICE FOR COLLECTING SOLAR ENERGY

Bernard Devin, Gif-sur-Yvette, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 19, 1976, Ser. No. 678,117
Claims priority, application France, Apr. 21, 1975, 75.12367
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 9 Claims

1. A method for collecting solar energy by means of a system of stationary collectors differently oriented with respect to the sun, of the type in which a heat-transporting fluid is circulated; circulating the heat-transporting fluid through said system of collectors connected together in series from the collector which is least exposed to solar radiation to the collector which is the most exposed to solar radiation and reversing the direction of flow of the fluid within the collectors automatically at a moment of the day which is determined beforehand so as to control the quantity of energy delivered by the collectors by flow of the heat transporting fluid from

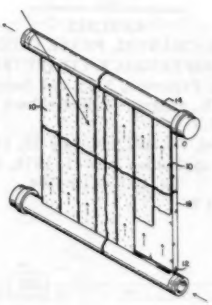


the collector least exposed to solar radiation to the collector most exposed to solar radiation.

4,031,881
SOLAR HEATER

Heinz E. P. Thiel, 468 Willis Drive, Oakville, Ontario, Canada

Filed Oct. 20, 1975, Ser. No. 624,249
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 2 Claims

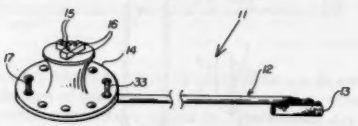


1. A solar heater comprising:
a plurality of liquid conducting metal pipes arranged in an array to receive incident solar radiation from a mean direction on one side of said array,
said metal pipes each being formed from sheet metal having a predetermined reflectivity on both sides bent to form a tube,
means for connecting to said pipes a liquid conduit connected to supply liquid to said pipes to flow therethrough,
means for connecting to said pipes a liquid conduit for carrying away liquid which has flowed through the pipes in said array,
said pipes in said array being provided, with a treated heat absorptive surface on the side thereof designed to approximately face the direction of incident solar radiation,
the pipes in said array being provided with an inner surface having the reflectivity produced by a surface not coarser than that providing a centre-line average of 60μ".

4,031,882
APPARATUS FOR INTERFACING TO ANATOMIC SIGNAL SOURCES

Carlo J. DeLuca, Newton, Mass., assignor to Liberty Mutual Insurance Company, Boston, Mass.

Division of Ser. No. 595,582, July 14, 1975. This application June 28, 1976, Ser. No. 700,195
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.1 R **5 Claims**



1. An electrical system for interfacing to anatomic signal sources and comprising:

terminal means suitable for anatomic implantation so as to receive primary signals generated physiologically;

coupling means comprising a piece of sheet material secured to said terminal means and being shaped and arranged for juxtaposition to the outer surface of a nerve, said sheet material having interstices of a size for receiving tissue growth after being implanted;

electrical lead means suitable for anatomic implantation and connected to said terminal means so as to receive said primary signals;

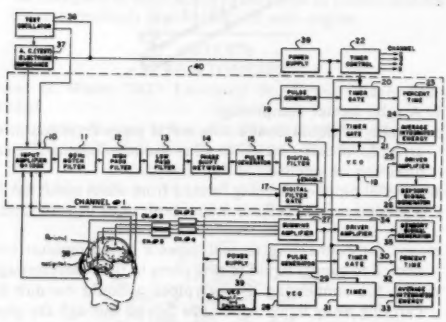
output circuit means connected to receive said primary signals from said electrical lead means; and

electrical insulator means suitable for anatomic implantation and enclosing said terminal means so as to shield said terminal means from noise signals generated physiologically, said insulator means comprising an elongated hollow casing closed at one end and enclosing said coupling means and of a size to surround the nerve so as to disrupt external electrical conductive paths to said terminal means.

4,031,883
MULTIPLE CHANNEL PHASE INTEGRATING BIOFEEDBACK COMPUTER

Lester G. Fehmi, Princeton, N.J., and Joseph R. Schneider, Larchmont, N.Y., assignors to Biofeedback Computers, Inc., Rocky Point, N.Y.

Division of Ser. No. 492,954, July 29, 1974, Pat. No. 3,978,847. This application July 21, 1976, Ser. No. 707,480
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.1 B **17 Claims**



1. An apparatus for measuring the electroencephalographic activity of at least two lobes of the brain of a human trainee and providing the trainee with a sensory signal in response to a combination of amplitude and the inphase activity of each of the brain lobes comprising:

a plurality of electrical contacts coupled to the head of the trainee, said contacts being disposed adjacent to at least two lobes or areas of the brain, and to a neutral area of the trainee's head for obtaining at least two signals from said contacts which correspond to each of said at least two lobes or areas of the brain;

at least one amplifier for amplifying said at least two signals;

filter means coupled to said at least one amplifier for filtering the signals to obtain output signals each within a defined frequency range;

a summing amplifier coupled to said filter means for summing the in-phase signals of the defined frequency band of the amplified brain wave activity to produce a phase relevant measure of the trainee's brain wave activity;

audio signal means coupled to said summing amplifier for producing an auditory signal and modulating the volume of the auditory signal responsive to the amplitude and phase of the summed brain wave activity, so as to present to the trainee an audible signal which reflects the degree of phase parity and amplitude of the signals recorded from said at least two lobes or areas of the brain.

15. An apparatus for measuring the bioelectrical activity such as muscle activity of at least two regions of the body of a human trainee and providing the trainee with a sensory signal in response to a combination of amplitude and the inphase activity of each of the regions of the body comprising,

a plurality of electrical contacts for coupling to the body of the trainee, said contacts being disposed adjacent to at least two regions of the body, and to a neutral area of the trainee's body so as to obtain at least two signals from said contacts which correspond to each of said at least two regions of the body;

at least one amplifier coupled to said contacts for amplifying said at least two signals;

a summing amplifier coupled to said at least one amplifier for summing the in-phase signals of the amplified signals to produce a phase relevant measure of the trainee's bioelectrical activity;

filter means coupled to said summing amplifier for filtering the summed signals to obtain an output signal within a defined frequency range; and

signal means coupled to said filter means for producing a tactile signal and modulating the magnitude of the tactile signal responsive to the amplitude and phase of the summed bioelectrical activity so as to present to the trainee and tactile signal which reflects the degree of phase parity and amplitude of the signals recorded from said at least two regions of the body.

4,031,884
APPARATUS FOR CORRELATING THE RESPIRATORY AND CARDIAC CYCLES

Daniel Georges Christian Henzel, Noisy le Grand, France, assignor to Institut National de la Sante et de la Recherche Medicale, Paris, France

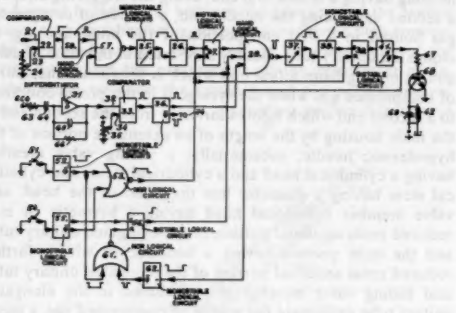
Filed June 2, 1975, Ser. No. 583,184
Claims priority, application France, June 7, 1974, 74.19669
Int. Cl.² A61B 5/02, 5/08
U.S. Cl. 128—2.05 R **9 Claims**

1. An apparatus for correlating respiratory and cardiac cycles comprising:

means for defining a chosen period in the progress of the respiratory cycle as the end of a regulatable delay beginning when the ascending front of the inspiratorial pressure reaches a regulatable level,

means for defining a chosen period in the progress of the cardiac cycle as the end of a regulatable delay beginning when the differential dV/dt of the blood pressure reaches a regulatable level,

means for activating an operator upon the coincidence of

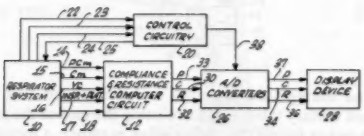


these two periods in time after a regulatable delay and during a regulatable period.

4,031,885
METHOD AND APPARATUS FOR DETERMINING PATIENT LUNG PRESSURE, COMPLIANCE AND RESISTANCE

James E. P. Davis, Santa Monica, and David M. Omelich, Cerritos, both of Calif., assignors to Puritan-Bennett Corporation, Kansas City, Mo.

Filed Oct. 15, 1975, Ser. No. 622,536
Int. Cl.² A61B 5/08
U.S. Cl. 128—2.08 13 Claims



1. For use with a respirator system of the volume-compensated type in which a preselected volume of gas is delivered to a patient during an inspiration phase of the patient breathing cycle, apparatus for the determination of patient compliance and resistance comprising:

control means operable to initiate computation and display of patient compliance and resistance;

means for sampling the system pressure at the end of the inspiration phase;

means included within said control means for ensuring a plateau phase, following the inspiration phase and preceeding an expiration phase, long enough to allow the system pressure to equalize with the patient lung pressure;

means for sampling the system pressure at the end of the plateau phase, to obtain a measure of the lung presure at the end of the inspiration phase;

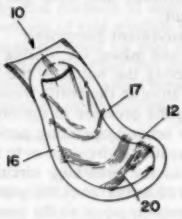
means for monitoring the actual volume of gas delivered to the patient; and

means for computing and displaying patient compliance, as derived from the monitored volume and the system pressure sampled at the end of the inspiration phase, and patient resistance, as derived from the monitored volume and the two sampled values of the system pressure.

4,031,886
OCCLUSIVE PESSARY

Vera B. Morhenn, 731 De Soto, Palo Alto, Calif. 94303

Continuation of Ser. No. 612,284, Sept. 11, 1975, abandoned.
This application Aug. 30, 1976, Ser. No. 718,614
Int. Cl.² A61F 5/24
U.S. Cl. 128—130 13 Claims

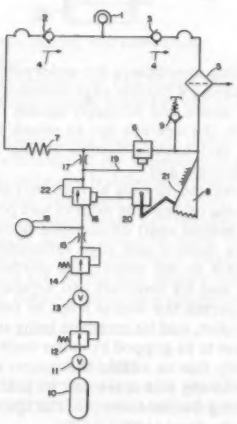


13. In combination, a pessary for the support and stabilization of the human uterus comprising a frame made of an elongated body of generally cross-section formed into a closed figure; and a bag made of thin and flexible material receiving said frame entirely therewithin, whereby said frame is totally enclosed within said bag.

4,031,887
BREATHING APPARATUS PROVIDING PRESSURE COMPENSATION

Imre Botos, Lidingo, and Ivan Aldine Hellquist, Rotebro, both of Sweden, assignors to AGA Aktiebolag, Sweden

Filed Feb. 26, 1976, Ser. No. 661,490
Claims priority, application Sweden, Mar. 14, 1975, 7502855
Int. Cl.² A62B 7/02
U.S. Cl. 128—142 R 8 Claims



1. Breathing apparatus for use under water, in a noxious atmosphere or under like conditions, said apparatus comprising:

a container for breathing gas,

a breathing circuit including connecting means, connected in said breathing circuit, for connection to the breathing organs of a user, carbon dioxide absorbing means connected in said breathing circuit and an expansible gas chamber connected in said breathing circuit,

a conduit for supplying breathing gas from said breathing gas container to said breathing circuit, and

means, including valve means connected in said conduit, for controlling the operation of said breathing circuit to

provide (i) a first operating period wherein said breathing circuit form a closed breathing circuit and a breathing gas is caused to circulate in said breathing circuit until the oxygen concentration of the circulating breathing gas is reduced to a predetermined value and (ii) a second operating period, which alternates with said first operating period, wherein the used breathing gas is released to the ambient environment and fresh gas is supplied to the breathing circuit;

wherein the improvement comprises:

a dosing bottle, and means for, during the first operating period, connecting the bottle to the breathing gas container so as to store in the bottle fresh gas having a pressure exceeding the pressure in the breathing circuit and for, during the second operating period, connecting the bottle to the breathing circuit so as to supply the contents of the bottle to the breathing circuit and thus to the expansible gas chamber until the pressure in the dosing bottle is substantially equal to the pressure in the breathing circuit.

4,031,888

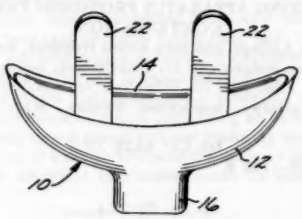
BREATHING MOUTHPIECE FOR UNDERWATER USE

William D. Walters, 2940 Andros St., Costa Mesa, Calif. 92626

Filed Jan. 5, 1976, Ser. No. 646,878

Int. Cl.² A62B *7/00*

U.S. Cl. 128—145 A **5 Claims**



1. A breathing mouthpiece for underwater use comprising:

a housing having a flexible edge contoured to surround the wearer's mouth and fit snugly against the face in spaced relation to the wearer's lips to permit free movement of the lips, said housing further having a central port to breath through; and

a pair of elongated, flexible bit members affixed interiorly to said housing on opposite sides of said port and sufficiently laterally spaced apart on opposite sides of said port, and projecting beyond said edge sufficiently, to fit between molar teeth of the wearer, the portion of said housing between said bit members and adjacent said port being open to permit the wearer's lips to come together adjacent said port, said bit members being sufficiently thick to allow them to be gripped by molar teeth of the wearer and sufficiently thin to enable the wearer's lips to come together whereby said mask can be held in position while yet allowing free movement of the lips and limited movement of the front teeth.

4,031,889

POWER OPERATED ASPIRATING HYPODERMIC SYRINGE

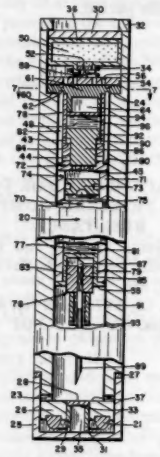
William Floyd Pike, 915 Alamosa, Carlsbad, N. Mex. 88220

Continuation-in-part of Ser. No. 559,961, March 25, 1975, Pat. No. 3,977,401, and a continuation-in-part of Ser. No. 593,771, July 14, 1975, Pat. No. 3,977,402. This application May 19, 1976, Ser. No. 687,893

Int. Cl.² A61M *5/00*

U.S. Cl. 128—215 **7 Claims**

1. A disposable gas pressure operated hypodermic syringe for automatically inserting a hypodermic needle into tissue, drawing a vacuum in said needle, and finally injecting medicament into the tissue, comprising: an elongated tubular main housing having a sealed first end, being the triggering end, and a second end, being the needle end; a source of compressed gas housed in a first end portion of the main housing; an elongated unitary tube slidably supported in the main housing and extending from a first end which is proximate the source of compressed gas when the syringe is in the preset condition to a second end which is foreshortened from the second end of the main housing by the length of an extensible portion of the hypodermic needle, substantially; a sliding valve member having a cylindrical head and a cylindrical stem, said cylindrical stem having a diameter less than that of the head, said valve member cylindrical head having a hermetic fit in a reduced cross sectional portion of the elongated unitary tube, and the stem portion having a hermetic fit with a further reduced cross sectional portion of the elongated unitary tube, said sliding valve member being situated in the elongated unitary tube proximate the source of compressed gas; a medicament chamber support in the elongated unitary tube between the sliding valve member and the second end of said elongated unitary tube; a piston closing the end of the medicament chamber facing the sliding valve member; a hypodermic needle supported in the second end of the elongated unitary tube proximate the medicament chamber, said hypodermic needle having an elongated end portion housed in and facing the second end of the main housing; manual means for releasing the compressed gas into the first end of the main housing to propel the elongated unitary tube to the second end of the main housing and to insert the elongated end portion of the hypodermic needle into tissue; means for admitting gas pressure to the head of the sliding valve member on the side facing the medicament chamber, means for restricting the movement of the sliding valve member to a selected rate of travel, the movement of the stem of said sliding valve producing a vacuum in the medicament chamber thereby effecting the function of aspirating, means controlled by the sliding valve member when it has completed the aspiration stroke, substantially, for admitting gas pressure into the medicament chamber to inject the medicament into tissue.



4,031,890

SAFETY I. V. INJECTOR

Gerlof Homan, St. Louis, Mo., assignor to Survival Technology, Inc., Bethesda, Md.

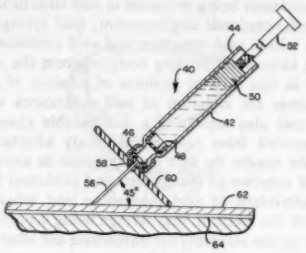
Filed Jan. 14, 1976, Ser. No. 648,972

Int. Cl.² A61M *5/32*

U.S. Cl. 128—215 **3 Claims**

1. An I.V. injector having a cylindrical barrel open at one

end and closed at the other end by sealing means, a cannula mounted on the closed end outwardly of the sealing means, a plunger slidably carried in the open end of the barrel, a chamber formed in the barrel between the plunger and the sealing means, said chamber being adapted to receive a high concentrate I.V. medicament, and means at the closed end of the barrel to prevent the presentation of the cannula at an included angle between the cannula and the patient's blood vessel of less than 45°, thus preventing proper intravenous



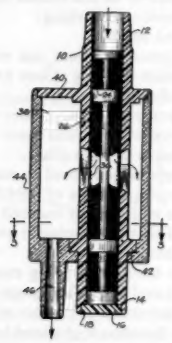
injection of the aforesaid medicament into a patient by causing the user to become aware that the usual intravenous injection procedure cannot be followed thereby inducing the user to check the injector, said means comprising spacer means mounted on the closed end of the barrel and extending perpendicularly outward from the longitudinal axis of the barrel a distance whereby the included angle between the cannula and the patient's blood vessel upon presentation of the cannula for injection will be at least 45° thereby making an intravenous injection impractical due to the steep angle of entry.

4,031,891

AIR ELIMINATING FILTER

Thurman S. Jess, Mundelein, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 3, 1975, Ser. No. 628,435
Int. Cl.² A01M 5/16
U.S. Cl. 128—214 R **2 Claims**



1. An air-eliminating filter for intravenous liquids comprising:

an elongated, hollow, tubular filter support member defining inlet means at one end thereof and closed at its other end, a plurality of circumferentially-spaced, longitudinally extending ribs defined along an intermediate portion of said tubular member, and circumferentially spaced window portions defined between said ribs to permit communication between the interior and exterior of said tubular support member;

a tubular, hydrophilic filter element capable of passing aqueous liquid therethrough when wet with said liquid, while simultaneously blocking the flow of air, positioned wthin said tubular member in coaxial relationship thereto, said hydrophilic filter element being carried by a central portion of said ribs to occlude central portions of said window openings;

a pair of tubular, hydrophobic filter elements capable of repelling aqueous liquid and passing air therethrough, each being positioned adjacent an end of said hydrophilic tubular filter element, said hydrophobic filter elements being carried by end portions of said ribs to block flow through end portions of said window openings,

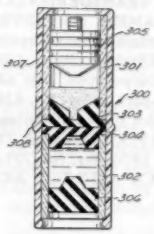
and manifold means mounted on said tubular member to enclose said hydrophilic filter but not to enclose said hydrophobic filters, said manifold means including outlet means to discharge liquid therefrom.

4,031,892

TWO-CHAMBER MIXING SYRINGE

Alfred A. Hurschman, Hudson, Ohio, assignor to Ampoules Corporation, Hudson, Ohio

Division of Ser. No. 489,746, July 18, 1974, Pat. No. 3,946,732, which is a continuation-in-part of Ser. No. 386,594, Aug. 8, 1973, abandoned. This application Feb. 13, 1976, Ser. No. 657,860
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 M **9 Claims**



1. A two-chamber mixing vial comprising:

a. a glass cylinder;

b. closure means closing one end of said cylinder;

c. an end diaphragm closing the other end of said cylinder; and

d. a stationary intermediate diaphragm within said cylinder separating the interior of the cylinder into first and second chambers respectively defined by said closure means and intermediate diaphragm and by said intermediate diaphragm and end diaphragm; said cylinder and intermediate diaphragm having coacting parts that comprise means for locking the intermediate diaphragm against axial movement toward the said plunger during a mixing operation and during a dispensing operation.

4,031,893

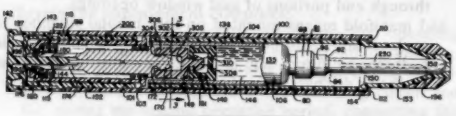
HYPODERMIC INJECTION DEVICE HAVING MEANS FOR VARYING THE MEDICAMENT CAPACITY THEREOF

Sheldon Kaplan, Potomac; George B. Calkins; Stanley J. Sarnoff, both of Bethesda, and N. Lawrence Dalling, Wheaton, all of Md., assignors to Survival Technology, Inc., Bethesda, Md.

Filed May 14, 1976, Ser. No. 686,636
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 F **6 Claims**

1. In a hypodermic injection device comprising a gun, a cartridge holder in operative relationship to the gun, a cartridge within the holder, said gun comprising a sleeve open at one end thereof, a plunger positioned within the sleeve, spring power means acting on said plunger tending to move it out the open end of the sleeve, restraining means cooperating with

said plunger to prevent plunger movement, safety means acting on said restraining means to render it inoperative, said cartridge holder comprising a hollow shell acting as a prolongation of the gun sleeve, said cartridge including an ampoule comprising a hollow cylindrical sleeve, a piston slidably positioned in one end thereof and means mounting a cannula extending from and closing off the other end, a medicament chamber formed between the piston and the cannula, the



cartridge fitting within the cartridge holder with the free end of the cannula within the end of the holder remote from the gun, a resilient sheath covering the cannula to maintain the cannula in sterile condition, the improvement comprising:

means positioned between the outer face of the piston and the adjacent end of the plunger to control the position of the piston within the ampoule sleeve thus determining the volume of the medicament chamber and thus the quantity of medicament carried in the syringe.

4,031,894

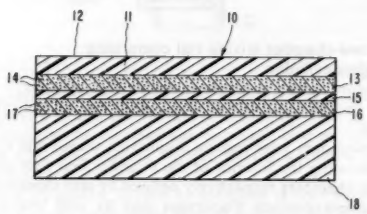
BANDAGE FOR TRANSDERMALLY ADMINISTERING SCOPOLAMINE TO PREVENT NAUSEA

John Urquhart; Santosh Kumar Chandrasekaran, both of Palo Alto, and Jane Elizabeth Shaw, Atherton, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 638,947, Dec. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 547,504, Feb. 6, 1975, abandoned. This application Sept. 7, 1976, Ser. No. 721,602

Int. Cl.² A61F *7/02;* **A61L** *15/06*

U.S. Cl. 128—268 **12 Claims**



1. A therapeutic system in the form of a bandage for administering scopolamine base through unbroken skin to inhibit emesis and nausea for a prolonged time period comprising a sandwich-type laminate of:

a. a backing lamina that is substantially impermeable to scopolamine base, one face of which forms the top of the bandage:

b. a scopolamine base reservoir lamina adjacent the opposite face of the backing lamina comprising

i. about 0.2 to about 3 mg scopolamine base dispersed in a gelled mixture of

ii. mineral oil of about 10 to about 100 cp at 25° c, and polyisobutene;

c. a microporous membrane lamina adjacent and below the scopolamine reservoir lamina through which the scopolamine base is released from the reservoir lamina after the bandage is affixed to the skin at a substantially constant rate in the range of about 0.3 to about 15 μg/hr; and

d. a contact adhesive lamina adjacent and below the microporous membrane lamina by which said bandage is affixed to the skin comprising about 10 to about 200 μg scopolamine base per cm^2 effective surface area dispersed in a gelled mixture of said mineral oil and said polyisobutene.

4,031,895

SYRINGE ASSEMBLY PACKAGE

Robert E. Porter, 1734 Machado St., Oceanside, Calif. 92054

Filed Apr. 5, 1976, Ser. No. 674,033

Int. Cl.² A61M *5/18;* **B65D** *81/32*

U.S. Cl. 128—272.1 **11 Claims**

1. A prepackaged syringe assembly comprising a support structure, a syringe having a discharge needle and a barrel adapted to be loaded with a first substance and a container adapted to be loaded with a second substance, said syringe and said container being mounted in said structure for relative slidable and rotational displacement, said syringe having its needle tip within said structure and said container mounting within the structure a sealing body wherein the needle tip is imbedded in one relative position of rotation of said syringe and container for isolation of said substances while in the structure and also mounting a puncturable closure element laterally spaced from said sealing body adapted to permit entry of the needle tip into the container in another relative position of rotation of the syringe and container in the package for admixture of said substances and reloading of the syringe with the mixture, said syringe being separable from the remainder of the assembly for immediate use after said reloading.

4,031,896

SURGICAL SUCTION SETS

Per Magnus Lennart Ronnmark, Gislaved, Sweden, assignor to Molnlycke AB, Gothenburg, Sweden

Filed Oct. 17, 1975, Ser. No. 623,500

Claims priority, application Sweden, Oct. 18, 1974, 7413157

Int. Cl.² A61M *1/00*

U.S. Cl. 128—276 **10 Claims**

1. A surgical suction device for removing fluid from a wound and adapted to be connected to a suction pump by a hose pipe, said device comprising:

a tubular-shaped handle,

an inner tube extending from one end of said handle and having a suction opening at one end thereof and a tip at the other end thereof,

an outer tube surrounding said inner tube to form an annular space therebetween, said inner and outer tubes being movable relative to each other,

a plurality of openings formed in said channel for quickly removing large quantities of fluid from a wound,

said outer tube including at one end thereof a tapered section having a suction opening at one end and a seat member at its other end, and

the tip of said inner tube being movable into and out of contact with said seat member so that when said tip and said seat member are in contact with each other, a single tube suction function is obtained in that suction is applied only to said tip, and when said tip and said seat member are out of contact with each other, a sump suction function is obtained in that suction is applied to both said plurality of openings and said tip.

4,031,897

COLLECTOR FOR AMNIOTIC FLUID

Adan Graetz, Apartado Postal 374, Cuernavaca, Mor, Mexico

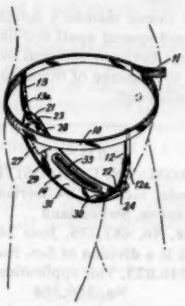
Filed Apr. 21, 1976, Ser. No. 679,060

Int. Cl.² A61F *5/44*

U.S. Cl. 128—286 **13 Claims**

1. An article for collecting and retaining amniotic fluid discharged from an expectant mother, which comprises

a. body encircling support means,
b. a flat, flexible pocket-forming member engaged at forward and rearward ends by said support means,
c. said pocket-forming member having a fluid receiving opening in its upper portion,
d. a fluid receiving receptacle formed of lightweight, flexible, foldable material and having its open upper end secured to and communicating with said openings,



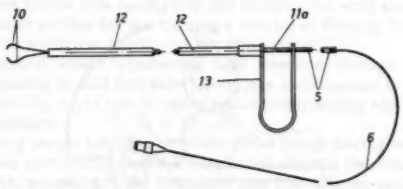
e. a flat pocket formed in said pocket-forming member, below said fluid receiving opening, for the reception and containment of said receptacle in a flat, folded condition,
f. said receptacle being quickly removable from said pocket while said article is being worn by the user, to place said receptacle in fluid receiving condition.

4,031,898

SURGICAL INSTRUMENT FOR COAGULATION PURPOSES

Siegfried Hiltebrandt, Aug.-Lammle-Str. 16, D-7134 Knittlelingen, and Helmut Wurster, Mozartstr. 20, D-7519 Oberderdingen, both of Germany

Continuation of Ser. No. 529,042, Dec. 3, 1974, abandoned. This application Sept. 13, 1976, Ser. No. 722,926
Int. Cl.² A61N *3/04*; A61B *17/38*
U.S. Cl. 128—303.1 **1 Claim**



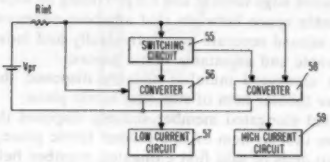
1. A coagulation probe having a head and having a heating element embodied within the head, the head being adapted to be heated up to a predetermined maximum temperature in a temperature range extending from about 110° C to about 150° C necessary for the coagulation of thermolabile tissue during a predetermined heating period and alternating cooling-off period for the head, the heating element being a part of a circuit energized by electrical current of an electrical voltage source and being adapted to be switched-off initiating and during the cooling-off period such that after this later period a sticking of tissue to the head is prevented, the said circuit having switch means for opening and closing said circuit adapted thereby to energize and deenergize respectively, the heating element, said switch means adapted to be automatically controlled by a settable electronic control means for closing said switch for a predetermined adjustable length of time and opening said switch for a predetermined length of time substantially equivalent to said cooling-off period and for working signal means giving signals at respectively a beginning and an end of said heating period, and giving a different signal for indicating the end of the cooling-off period.

4,031,899

LONG LIFE CARDIAC PACER WITH SWITCHING POWER DELIVERY MEANS AND METHOD OF ALTERNATELY DELIVERING POWER TO RESPECTIVE CIRCUIT PORTIONS OF A STIMULUS DELIVERY SYSTEM

Alexis C. M. Renirie, Dieren, Netherlands, assignor to Vitatron Medical B.V., Dieren, Netherlands

Filed Jan. 22, 1976, Ser. No. 651,549
Int. Cl.² A61N *1/36*
U.S. Cl. 128—419 PS **38 Claims**



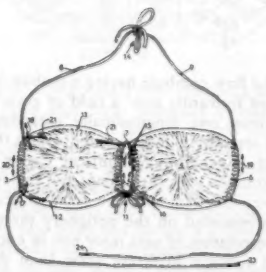
1. Self contained pacer apparatus for delivering stimulus pulses, comprising:
a. a battery source which provides an output which varies with the loading thereof and having characteristics which vary as a function of its energy depletion;
b. a source sensitive stimulus pulse generating circuit;
c. a stimulus output circuit, driven by the output of said source sensitive circuit, for delivering said stimulus pulses; and
d. connecting means for connecting said source output respectively to said source sensitive circuit and to said stimulus output circuit so that the loading of each of said circuits has no effect upon said source output when connected to the other of said circuits.

4,031,900

BRASSIERE ADJUSTABLE IN HEIGHT, IN PARTICULAR FOR BATHING SUITS

Christian Guidoni, Immeuble "Le Plein Horizon" 62 Chemin du Bois, Rillieux la Pape, Rhone, France

Filed June 14, 1974, Ser. No. 479,536
Claims priority, application France, June 15, 1973, 73.22580
Int. Cl.² A41C *3/00*; A41D *7/00*
U.S. Cl. 128—493 **9 Claims**



1. A brassiere comprising, in combination:

first and second separate and individually and independently movable and adjustable fabric pieces;

said first fabric piece having tubular hems at opposite edges thereof;

said second fabric piece having tubular hems at opposite edges thereof;

said first and second fabric pieces comprising two surfaces of fabric which constitute pouches each of which has a substantially rectangular shape on which said tubular hems border the vertical sides thereof, and on which the upper horizontal side thereof is provided with a flat seam, and on which the lower horizontal side thereof has a hem inside of which an elastic means is provided;

said elastic means being connected to the fabric near the corners of said rectangular surface;

first means slidably disposed through a tubular hem of said first fabric piece and through a tubular hem of said second fabric piece for independently adjustably and removably interconnecting said first and second fabric pieces at adjacent edge thereof and for providing an adjustable and variable space between said adjacent edges of said first and second separate and individually and independently movable and adjustable fabric pieces;

a first elongated member slidably disposed through the other tubular hem of said first fabric piece;

a second elongated member slidably disposed through the other tubular hem of said second fabric piece; and

the two ends of said first elongated member being removably and adjustably connected to the two ends of said second elongated member for independently adjustably and removably interconnecting said first and second fabric pieces at the remote edges thereof and for facilitating easy removal of said brassiere from the wearer thereof.

4,031,901

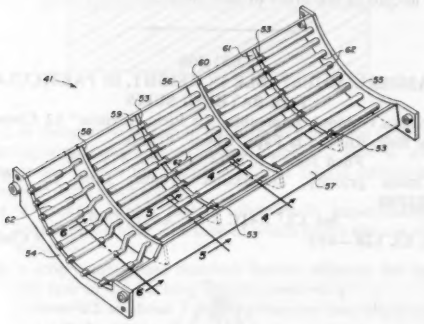
CONCAVE FOR AN AXIAL FLOW TYPE COMBINE

Edward W. Rowland-Hill, Lancaster, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed June 7, 1976, Ser. No. 693,676

Int. Cl.² A01F *12/24*

U.S. Cl. 130—27 T **40 Claims**



1. In an axial flow combine having a mobile frame adapted to be propelled forwardly over a field of grain bearing crop material, at least one longitudinally extending axial flow threshing and separating unit mounted within the frame, said unit including a generally cylindrical casing and a rotor mounted for rotation with the casing, said casing including an improved lower longitudinally extending concave, the rotor having means mounted on the periphery thereof and being operable upon rotation of said rotor and in cooperation with the improved concave to thresh grain from the unthreshed grain bearing crop material introduced into said unit and advance the crop material through said unit while subjecting the crop material to a threshing and separating action wherein threshed and separated grain material passes through said concave to a grain handling and cleaning means disposed underneath said axial flow unit, said improved concave comprising:

a. a plurality of longitudinally extending rod-like members;

b. at least two spaced apart transversely extending arcuate shaped support members for supporting said rod-like members, said rod-like members being arranged to define an arc about a common axis and aligned generally parallel to each other; and

c. one or more sleeve members rotatably mounted on at least one of said spaced apart rod-like members so as to define openings between adjacent ones of said members and facilitate the passage of threshed and separated crop material therethrough.

4,031,902

AROMATIC COMPOSITIONS

Edouard P. Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 482,776, June 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 12, 1975, Ser. No. 586,384

Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72

The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.

Int. Cl.² A24B *15/04*

U.S. Cl. 131—17 R **3 Claims**

3. A tobacco flavouring composition which comprises octa-3,5-dien-2-one.

4,031,903

WINNOWING OF TOBACCO

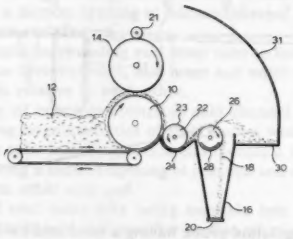
Warren A. Brackmann, Cooksville, and Daniel DiIanni, Toronto, both of Canada, assignors to Rothmans of Pall Mall Canada Limited, Toronto, Canada

Filed Aug. 29, 1975, Ser. No. 608,842

Claims priority, application United Kingdom, Sept. 5, 1974, 38921/74

Int. Cl.² A24B *1/02*; A24C *1/02*; A24B *7/14*

U.S. Cl. 131—109 B **26 Claims**



1. A method for the production from a source of tobacco particles of a relatively wide and thin downwardly-flowing stream of tobacco particles moving at a speed in excess of that achievable by gravitational forces alone, which comprises:

forming from said source a broad stream of tobacco particles of width substantially equal to the width of said downwardly-flowing stream, said tobacco particles in said broad stream flowing at a predetermined speed in substantially separated condition one from another in a flow path intersecting a plane of flow of said downwardly-flowing stream,

rotating adjacent to and beneath said broad stream and at the upper end of said downwardly-flowing stream an air-permeable and tobacco-impermeable foraminous cylindrical surface of length substantially equal to the

width of said broad stream about its axis parallel to said plane of flow of said downwardly-flowing stream at a peripheral speed at least equal to said predetermined speed and equal to the speed of particles in said downwardly-flowing stream,

subjecting the tobacco particles in said broad stream to air flow transverse to the direction of movement thereof towards said foraminous surface by suction air flow applied across said foraminous surface, to deflect tobacco particles from said broad stream into engagement with said foraminous surface,

gripping said deflected and engaged particles to said foraminous surface by said suction whereby said gripped particles assume the speed of said foraminous surface and remain in substantially separated condition,

transporting said gripped particles on said foraminous surface until the particles are moving in a substantially vertically-downwardly direction, and

releasing said transported particles from said suction grip when they are moving in said vertically downwardly direction to form said downwardly-flowing stream of tobacco.

4,031,904

REMOVABLE WATER TIGHT BASE FOR BONG

Eric Karl, Los Angeles, Calif., assignor to Sarah's Family, Inc., Inglewood, Calif.

Filed Sept. 16, 1976, Ser. No. 723,875
Int. Cl.² A24F *1/30*
U.S. Cl. 131—173 **7 Claims**

1. A device for filtering tobacco smoke through liquid comprising:

a first hollow tube having first and second open ends and an outer surface for maintaining a volume of filtering liquid and having an opening in the side thereof;

a second smoke conducting tube disposed through the opening in said first tube having one end disposed in the filtering liquid and the other end communicating with the tobacco;

sealing means having a circumferential flange having inner and outer surfaces and a mouth and adapted for detachable mounting to the bottom of said first tube for sealing said first end of said first tube; and

base means having a recess for receiving sealing means for providing additional pressure to said sealing means and for providing a support for the combination of said sealing means and said first tube.

4,031,905

SMOKING TUBE WITH CHECK VALVE

John C. Dunn, 1640 - W. 14th St., Davenport, Iowa 52804

Filed Sept. 11, 1975, Ser. No. 612,265
Int. Cl.² A24F *1/30*
U.S. Cl. 131—173 **2 Claims**

1. A smoking device comprising a hollow base to function as a reservoir for water, a hollow stem extending upwardly from said base, a bowl for holding smoking material, said bowl connected to the upper end of said stem and having a small aperture through the bottom thereof communicating through said stem to the inside of said hollow base, a mouthpiece tube extending upwardly from said hollow base, the cross-section of said mouthpiece tube being substantially greater than that of said stem, a check valve having a valve port and a sealing member, said valve port having an upwardly facing opening communicating between the inside of said mouthpiece tube and the inside of said hollow base, said sealing member being contained within said mouthpiece tube, said sealing member having a specific gravity somewhat greater than unity and being adapted to drop to a position over said opening for substantially restricting flow of water through said port, said mouthpiece tube having a mouthpiece opposite said hollow

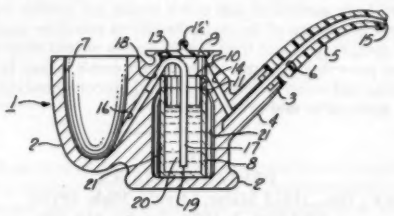
base, said smoking device to contain a sufficient amount of water to fill said hollow base and the adjacent portions of said stem and said mouthpiece tube to a level above said sealing member, and said sealing member being free to move upwardly above said port in response to inhalation through said mouthpiece to permit water to flow upwardly through said port to raise the level of water in said mouthpiece tube and being free to drop upon cessation of inhalation to prevent rapid reversal of flow of water through said port and upwardly into said stem.

4,031,906

WATER PIPE

Lawrence Robert Knapp, 122 W. Edna St., Munhall, Pa. 15120

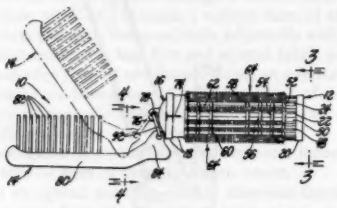
Continuation of Ser. No. 528,279, Nov. 29, 1974, abandoned, which is a continuation of Ser. No. 432,908, Jan. 14, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,515
Int. Cl.² A24F *1/14*
U.S. Cl. 131—173 **1 Claim**



1. A water pipe comprising a solid one-piece pipe body with an upwardly open pipe bowl integrally formed therein, an upwardly open cylindrical chamber in said solid one-piece body beside said bowl with the cylindrical axis of said chamber also extending upwardly, a pipe stem extending from said body and having a passage therethrough communicating with said chamber, an upwardly open transparent liquid container received within said body and having a cylindrical upwardly open end received within said chamber below the point of communication of said passage with said chamber and in sealed relationship therewith for the full perimeter of said container end, said transparent liquid container having side wall portions thereof exposed through an opening in the walls

of said body to the exterior, tube means communicating the interior of said bowl with the interior of said container, and removable access means independent of said tube means and sealing the upwardly open end of said chamber without obstructing the open communication of said passage with said chamber to provide access to the interior of said chamber and said container.

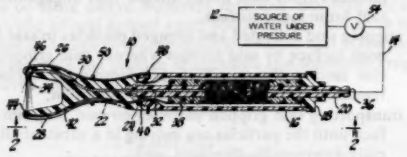
4,031,907
HAIR CURLING APPARATUS
William B. Rogers, Rte. No. 1, East Jordan, Mich. 49727
Filed July 6, 1976, Ser. No. 702,696
Int. Cl.² A45D *2/00*
U.S. Cl. 132—40 **1 Claim**



1. Hair curling apparatus, comprising generally cylindrical roller means having a plurality of apertures formed therein, and comb means usable to comb a tress of hair and pivotally connected to said roller means for rotation about an axis extending generally normal to the central axis thereof, said comb means comprising an elongated body portion having a plurality of teeth extending at substantially a right angle to said body portion, said comb means having at least two operating positions relative to said roller means, the body portion of said comb means extending away from said roller means in one of said operating positions thereby conditioning said comb means for use in combing selected strands of hair into a tress, said roller means being conditioned to accept and roll said tress of hair thereabout into at least one coil of hair while said comb means is in said one operatng position, said comb means being rotatable about its axis of rotation relative to said roller means to a second operating position, the teeth on said comb means penetrating the trees of hair on said roller means and being received in one of the apertures in said roller means so as to prevent uncoiling of the coiled tress of hair from said roller means, the teeth of said comb means being of thin generally columnar configuration substantially the entire length thereof and of a dimension longitudinally of the elongated body portion of said comb means not greater than the lateral dimension of the teeth thereby to minimize separation and spreading of said tress longitudinally of said roller means upon penetration of the teeth of said comb means into said tress as said comb means moves to said second position within the aperture in said roller means.

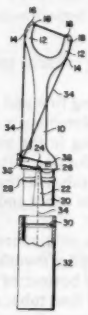
4,031,908
DENTAL APPLIANCE
Wen C. Ting, 31815 Maine, Livonia, Mich. 48150
Filed Sept. 4, 1975, Ser. No. 610,270
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 **3 Claims**

1. Mouth cleaning apparatus comrprising:
a source of liquid under pressure;
a hollow body;
a head mounted on the body, said head having a pair of spaced arms suited for supporting a length of dental floss between them, a first of said arms having an opening, and first conduit means connected with said opening for discharging a stream of liquid adjacent said arms;
an elongated tube having one end connected to the head so as to be supported in the body, the tube being connected to the source of liquid under pressure and having longitudinal second conduit means fluidly connected to the first conduit means for cooperating therewith for passing liquid therethrough from said source to the opening in the head;
plug means mounted on the body opposite the head for supporting the tube end opposite the end connected to the head, the plug being removeable from the body to permit removal of the tube therefrom, and to permit access into the body; and



a length of dental floss disposed in the body in a stored position about the tube and the second conduit means, the floss being extended from said stored position in the body so as to be connected between the arms of the head in a position adjacent said head opening, the floss on one side of the arm being clamped betweem the head and the body and the floss on the opposite side of the arms being connected to the head whereby the floss between the arms is supported in a taut position for removing matter from the teeth of the user as a stream of liquid is being discharged adjacent the floss.

4,031,909
DENTAL FLOSS HOLDER AND DISPENSER
John J. Kelley, Harwinton, Conn., assignor to The Raymond Lee Organization, Inc., a part interest
Filed May 25, 1976, Ser. No. 689,731
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 **3 Claims**



1. A dental floss holder and dispenser comprising:
a forked member having a shank with two spaced outwardly disposed prongs at one end, said prongs having outer surfaces with longitudinally extending grooves and tips with transversely disposed aligned bores essentially coplanar with the grooves;
a longitudinally disposed sleeve secured at one end to the other end of the shank, said sleeve having a first conically shaped hollow bore extending longitudinally through the sleeve between its ends, the apex of the bore being disposed at one end of the sleeve, said sleeve having a second bore extending transversely from the outside surface to said apex;
a floss cutter secured to said shank adjacent said other end;
a hollow container with floss therein detachably engaging the sleeve, said floss passing through said first and second

bores, along said grooves, through the aligned bores of the prongs and terminating at the cutter; and

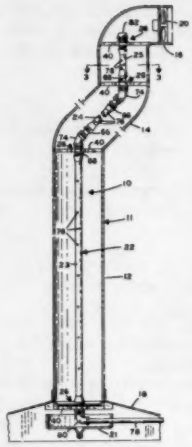
manually vertically adjustable slidable means secured to said shank intermediate its ends for detachably engaging the floss before it reaches the prongs and after it leaves the prongs to draw taut that portion of the floss which extends between the aligned bores in the prongs.

4,031,910

ARTICULATED SPRAY APPLICATOR PARTICULARLY SUITED FOR USE IN CLEANING FLUES AND THE LIKE

Richard L. Lawson, 3272 N. Greenwood Ave., Sanger, Calif. 93657

Filed Jan. 21, 1976, Ser. No. 651,032
Int. Cl.² B08B *3/02, 9/02*
U.S. Cl. 134—167 C **12 Claims**



5. A spray applicator for the interior of a flue or the like having a plurality of angularly related successively interconnected segments comprising:

A. Spray conduits individual to the flue segments;

B. means interconnecting the conduits in successive fluid communication and mounting said conduits for independent rotation in their respective flue segments;

C. means for supplying the interconnected conduits with spray fluid under pressure; and

D. means for independently rotating the conduits in their respective flue segments.

4,031,911

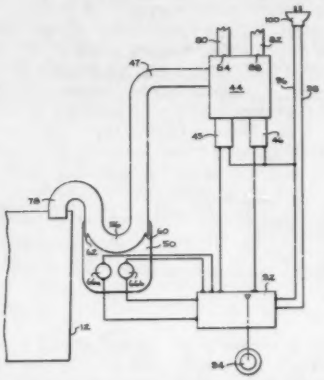
LAUNDRY MACHINE IMPROVED WATER TEMPERATURE CONTROL AND METHOD

Joseph H. Frazar, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Apr. 30, 1976, Ser. No. 682,144
Int. Cl.² F16K *11/24*
U.S. Cl. 137—3 **11 Claims**

1. In an automatic clothes washer having a tub for containing water and a water mixing valve with a hot water inlet and a cold water inlet, control means for opening and closing at least one of said water inlets to regulate the mixed water temperature in the tub including a temperature responsive switch, a water conduit means from the water valve to the tub, the improvement comprising:

a water sampling tank having an inlet opening, an outlet opening, and a water chamber therebetween, said tank being in water flow communication with the conduit means and arranged to divert a small portion of the water passing through the conduit means through the chamber, said temperature responsive switch being in temperature sensing relationship with the water in the chamber and calibrated to actuate at one preselected temperature and



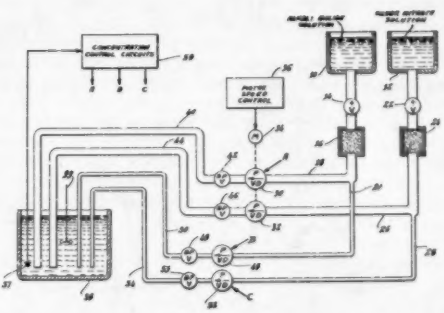
de-actuate at a preselected different temperature to regulate the mixed water temperature in the tub between the two temperatures.

4,031,912

REACTANTS ADDITION AND CONCENTRATION CONTROL SYSTEM

Shau-Zou Lu, Vestal, and Henry Nowicki, Endwell, both of N.Y., assignors to GAF Corporation, New York, N.Y.

Filed June 4, 1976, Ser. No. 692,688
Int. Cl.² G05D *11/08*
U.S. Cl. 137—5 **17 Claims**



13. A method of controlling the concentration of a constituent of a product prepared by mixing a constituent-deficient component and a constituent-rich component in a vessel comprising the steps of:

establishing a primary addition rate at which each component is continuously delivered to the vessel during the mixing operation;

measuring the concentration of the constituent in the vessel during the mixing operation to determine whether the concentration deviates from a predetermined value;

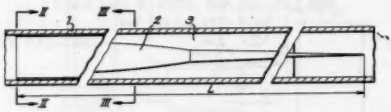
intermittently supplying to the vessel secondary amounts of the component required to reduce the deviation where the deviation falls within the predetermined range; and

altering the primary addition rate of one of the components as a direct function of the deviation where the deviation falls outside the predetermined range.

4,031,913
FROTH FORMATION LIMITER FOR DRAWINGS-OFF DEVICE OF CARBON DIOXIDE CONTAINING BEVERAGES

Ramon Apellaniz, Lasne-Chapelle-Saint-Lambert, Belgium, assignor to Euracom S.A., Brussels, Belgium

Filed June 3, 1975, Ser. No. 583,459
Claims priority, application Belgium, June 5, 1974, 253663; May 29, 1975, 254366
Int. Cl.² B67D *1/12*
U.S. Cl. 137—170.1 **9 Claims**



1. A foam formation limiter for drawing-off devices for containers of pressurized carbonated beverages, comprising:

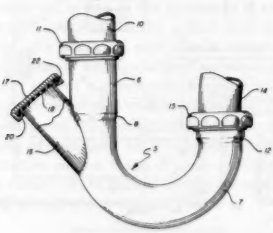
a cylindrical tubular member having a beverage entrance end and defining a flow path for said beverage; and

a foam limiter comprising an elongated member extending centrally within said tubular member and defining with said tubular member and annular flow path for said beverage, said foam limiter being of greatest diameter at said entrance end and tapering to a point in the direction of beverage flow in said tubular member whereby to define, with said tubular member, an annular flow path of increasing sectional area and decreasing boundary surface area, said foam limiter tapering differently in first and second regions of its length said first region tapering convexly and according to a parabolic law and said second region tapering to said point according to a hyperbolic law.

4,031,914
SINK TRAP WITH CLEAN OUT OPENING

John E. Neri, 4776 Lawndale Road, Syracuse, N.Y. 13215

Filed Dec. 31, 1975, Ser. No. 645,521
Int. Cl.² F16K *9/00*
U.S. Cl. 137—247.51 **1 Claim**

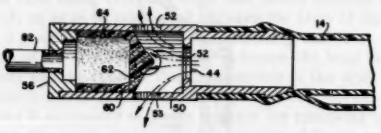


1. In a one piece sink trap, a tubular J-bend having a vertical leg portion terminating at its lower end in an arcuate portion, the arcuate portion bending through substantially 180° from its junction with the leg portion and terminating in an upwardly facing open end, the cross-sectional area of the J-bend being substantially constant from one end to the other, clean out means for the sink trap comprising a unitary tubular branch member that is integrally connected to and communicates with the leg portion of the J-bend adjacent its junction with the arcuate portion, the cross-sectional area of the branch member being substantially the same as that of the J-bend, the branch member extending obliquely upwardly and outwardly from its connection with the J-bend and having an upwardly facing open upper end, the opening at the upper end of the branch member being as large as the cross section of the remainder of the member, a manually removable non-threaded twist-off cap normally forming a closure for the upper end of the branch member, the upper end of the branch member being formed with an outwardly projecting flange having notches therein, the cap having inwardly projecting lugs at its lower edge dimensioned so as to pass through the flange notches whereby twisting the cap brings no lugs into securing engagement with the underside of the branch member flange, and means on the cap that coacts with the branch member upper end to seal the connection therebetween.

4,031,915
IRRIGATION SYSTEM FLUSHING VALVE

Bruce A. McElhoe, Waialua, and Joseph G. Tabrah, Kahuku, both of Hawaii, assignors to Hawaiian Sugar Planters' Association, Honolulu, Hawaii

Division of Ser. No. 522,912, Nov. 11, 1974, Pat. No. 3,921,905. This application June 12, 1975, Ser. No. 586,213
Int. Cl.² F16K *15/14*
U.S. Cl. 137—529 **3 Claims**



1. A springless valve for controlling the discharge of fluid from a conduit, said valve comprising:

a housing including:

a longitudinally extending, cylindrically shaped chamber having a cylindrical side wall portion and front and rear end wall portions,

an inlet opening associated at said front end wall portion of said chamber and being arranged to conduct pressurized fluid from said conduit to said chamber,

a pilot opening extending though said rear end wall portion of said chamber and being aligned with said inlet opening to conduct pressurized pilot fluid to said chamber, and

an outlet opening arranged in the side wall portion of said chamber and disposed axially rearwardly and radially outwardly of said inlet opening, to conduct pressurized fluid from said chamber,

a valve element slidably disposed in said chamber, said valve element being formed of resiliently deformable material and comprising:

a head portion disposed opposite said inlet opening, and

a cylindrical skirt portion integral with said head portion and defining a recess which opens generally rearwardly toward said pilot opening,

said skirt portion having a cylindrical outer wall free of outward projections and extending from said head portion to the end of the recess and lying generally opposite said cylindrical side wall portion of said housing;

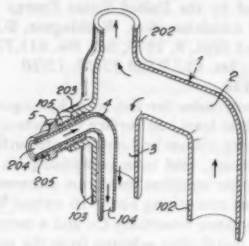
said valve element being rearwardly slidable in response to urgings of pressurized fluid from said inlet opening to allow passage of fluid from said inlet opening to said outlet opening; and

said valve element being forwardly slidable and resiliently expandable, in response soley to sufficient urgings of pilot fluid pressure from said pilot opening acting within said recess, such that said head portion extends into sealing engagement with said inlet opening, and said skirt portion expands radially outwardly into direct sealing contact with the edges of said outlet means and with said cylindrical side wall portion, from said outlet openings to the rear end of said recess, to block the flow of fluid from said inlet opening to said outlet opening.

4,031,916
FITTING FOR A RADIATOR IN A SINGLE DUCT HEATING SYSTEM

Angelo Camerano, Savona, Italy, assignor to Monorapid S.A.S. di Camerano Angelo & C., Sanova, Italy

Filed Mar. 12, 1975, Ser. No. 557,868
Claims priority, application Italy, Mar. 13, 1974, 12530/74
Int. Cl.² F16L 41/02
U.S. Cl. 137—561 A 5 Claims



1. In a single duct heating system, of the type in which a single main flow pipe serves for supplying heating water to a radiator and for returning water therefrom, a fitting for joining a radiator to the main flow pipe, said fitting being in the form of a housing comprising:

a. an inflow duct connected to the main flow pipe through a pipe union;

b. an inlet duct for the radiator veering off from the said inflow duct at an upward angle and connected to an inlet pipe for the radiator through a pipe union, said inlet duct defining an inlet axis;

c. an outflow duct connected to the main flow pipe through a pipe union, said outflow duct being a continuation of the inflow duct veering off therefrom in a downward direction and defining an outflow axis coaxial with said inlet axis;

d. a further pipe union for connection to a return conduit from the radiator, said pipe union being arranged with its axis perpendicular to the outflow axis of the outflow duct;

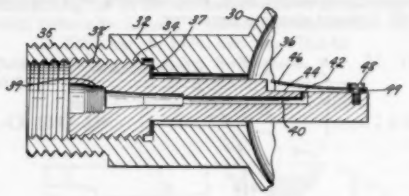
e. a return duct consisting of an open ended pipe section disposed within the housing, said pipe section being tightly fitted by one of its ends into the said further pipe union and by the other of its ends into the outflow duct and having a bend therein of substantially 90° so that the said ends are substantially perpendicular to each other, whereby the return flow from the radiator flows in the same direction as the outflow in the outflow duct.

4,031,917
CONSTANT FLOW GAS REGULATOR

Charles R. De John, 35 Beverly Road, West Caldwell, N.J. 07006, and Edwin L. Heger, 271 Henry St., Paramus, N.J. 07652

Continuation-in-part of Ser. No. 458,520, April 8, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,009
Int. Cl.² F16K 15/14, 17/24
U.S. Cl. 137—613 11 Claims

1. A constant-flow gas regulator apparatus adapted to be mounted inside of a vessel containing gas under high pressure comprising an elongated regulator body having at least one flat surface, a conduit through said body with one end thereof terminating in an opening in said flat surface in communication with the interior of the vessel and its other end communicating with the exterior of the vessel, and an elongated, radiused, resilient spring reed having a radius of curvature throughout its entire length and having one end thereof operably secured to said surface with a portion of said spring reed extending over the opening in said surface in spaced relation thereto such that the longitudinal axis of said reed is positioned above said opening, the surface area of said reed being about 15 to 100 times the surface area of said conduit opening, whereby said spring reed is maintained in spaced relation

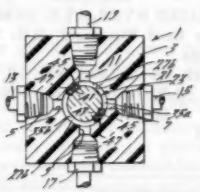


to said opening so as to maintain a substantially constant gas flow rate from the regulator as the internal gas pressure in the vessel decreases or fluctuates over a wide pressure range.

4,031,918
ROTARY SPOOL VALVE

Harlan R. Cagle, Cheboygan, Mich., assignor to Sahlin International, Inc., Birmingham, Mich.

Filed May 24, 1976, Ser. No. 689,007
Int. Cl.² F16K 11/07
U.S. Cl. 137—625.23 17 Claims



1. In a valve having a body with a cylindrical bore and a plurality of ports opening into said bore, a generally cylindrical spool assembly rotatably mounted in said bore to control flow between said ports, said spool assembly comprising a spool member and an elastomeric O-ring member mounted on the spool member, said O-ring member being stretched lengthwise of the spool member and secured thereto so that it extends substantially less than all the way around the circumference of the spool member, said O-ring member sealingly engaging the wall of said bore and being rotatable with the spool assembly to pass across from one side to the other of at least one of said ports and provide means for flow control for said one port.

4,031,919
ARTICULATED RISER

John E. Ortloff; Alfred S. Arcache, and Robert E. Haring, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Continuation of Ser. No. 186,881, Oct. 6, 1971, abandoned. This application Aug. 18, 1975, Ser. No. 605,588
Int. Cl.² F17D 1/08
U.S. Cl. 137—799 9 Claims

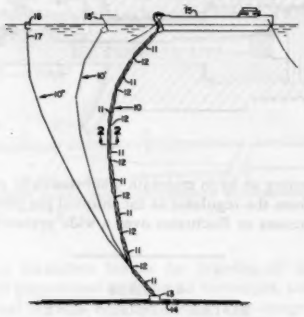
1. An articulated marine riser apparatus comprising:

a. at least two elongate structures situated in end-to-end relation and arranged in a substantially vertical orientation, each said structure including at least three rigid, fluid-handling lines that are rigidly affixed thereto and extend the length thereof;

b. a universal joint connecting each adjacent pair of elongate structures, each said joint serving to transfer axial loads between the adjacent structures and including a

pair of transverse flexural axes to permit omnidirectional flexure;

c. at least three flexible fluid-handling lines that interconnect corresponding rigid, fluid-handling lines situated in the adjacent elongate structures;



d. a foundation structure situated on the floor of a body of water; and

e. a universal joint interconnecting said foundation structure and the lowermost elongate structure.

4,031,920

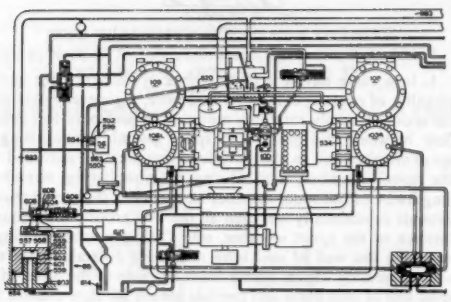
PRESSURIZED HYDRAULIC SUMP SYSTEM

William Maurice Bard Fitzgerald, R.R. No. 1, Claremont, Ontario, Canada

Division of Ser. No. 305,453, Nov. 10, 1972, Pat. No. 3,841,797. This application Sept. 9, 1974, Ser. No. 504,723

Int. Cl.² F16L *55/04*

U.S. Cl. 138—31 **4 Claims**



1. A pressurized hydraulic sump system comprising means defining a variable volume reservoir,

a sump manifold in fluid communication with said reservoir,

a control valve having a first port communicating with the sump manifold and having a movable valve member therein responsive to sump pressure in said manifold,

said means comprising a piston defining a movable wall of said reservoir which is backed by a fluid space and displaceable to vary the volume of the reservoir in response to differences between hydraulic pressure in said reservoir and hydraulic pressure within said fluid space, a source of fluid pressure,

the control valve being a shuttle valve, an outlet port connected to said fluid space, and a further port connected to said source of fluid pressure

said valve member being spring-biased and displaceable against its spring bias in response to sump pressure at said first port to a first position connecting said outlet port to said first port and a second position connecting said further port to said outlet port,

the piston being displaceable in one or other direction according to whether the sump pressure is greater or less than the value determined by the magnitude of said spring bias.

4,031,921

HYDROGEN-ISOTOPE PERMEATION BARRIER

Victor A. Maroni, Naperville, and Erven H. Van Deventer, Joliet, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 9, 1975, Ser. No. 611,722

Int. Cl.² B32B *15/18, 15/20*

U.S. Cl. 138—140 **2 Claims**

1. A composite tube for use as a hydrogen barrier in a system in which at least one surface contacts a molten salt of lithium containing tritium and an opposite surface contacts a liquid metal stream, said tube comprising an inner tubular layer of austenitic stainless steel, an intermediate, tubular layer of a bronze comprising about 10 weight % A1, 4 weight % Fe and the balance essentially Cu and a outer tubular layer of a refractory metal alloy selected from the group consisting of molybdenum base alloys, niobium base alloys and vanadium base alloys, said outer tubular layer being adapted for contacting said molten base of lithium metal.

4,031,922

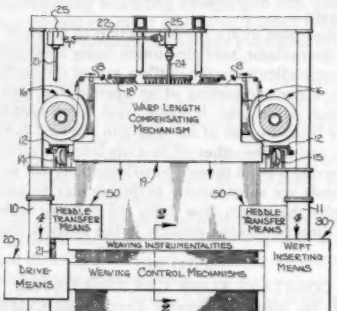
VERTICALLY ARRANGED TRIAXIAL WEAVING MACHINE

Wayne C. Trost, Burns Darsie, and Frank P. Trumpio, all of Rockford, Ill., assignors to Barber-Colman Company, Rockford, Ill.

Filed Mar. 25, 1976, Ser. No. 670,341

Int. Cl.² D03D *41/00*

U.S. Cl. 139—11 **5 Claims**

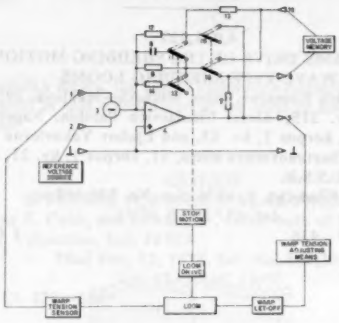


1. A weaving machine for making triaxial fabrics comprising creel means for supplying warp strands and mounted for rotation about a generally vertical axis, a plurality of elongate heddles arranged in weftwise rows spaced vertically from said creel means for guiding warp strands supplied from said creel means, means engaging warp strands intermediate said creel means and said heddles for guiding warp strands into an array of two generally parallel sheets of generally parallel warp yarns, means for moving said heddles longitudinally to form the warp strands into warp sheds and for moving said heddles and the warp strands guided thereby weftwise during weaving in timed relation with rotation of said creel means, and means for transferring said heddles from one end of one weftwise row to an adjacent end of another weftwise row.

4,031,923
WARP TENSION CONTROLLER

Adrianus Henricus van Duynhoven, Deurne, Netherlands, assignor to Ruti-Te Strake B.V., Deurne, Netherlands

Filed Dec. 18, 1975, Ser. No. 641,987
Claims priority, application Netherlands, Feb. 25, 1975, 7502246
Int. Cl.² D03D 49/06
U.S. Cl. 139—97 2 Claims



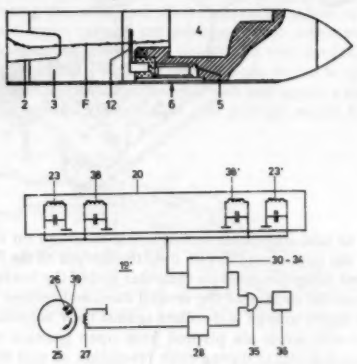
1. A warp tension controller for a loom, comprising a warp tension sensor for generating a first signal which is a measure of the warp tension, a source of a reference signal, means for comparing said signals and producing an output signal representing deviation of said first signal from said reference signal, an operational amplifier having an inverting input connected to receive said output signal, and having an output connected to means for adjusting the warp tension, and a feedback circuit connected between said input and said output of said amplifier, comprising a resistor in parallel to an integrating capacitor, wherein the improvement comprises a voltage memory having an input connected to the output of said amplifier, for producing a sustained output voltage equal to the voltage applied to its input when the loom is running, and a switch which during slower than normal operation of the loom connects a relatively small resistance between the input and the output of said amplifier, disconnects said capacitor from the output of said amplifier and connects it to the output of said voltage memory, to apply to said capacitor a voltage equal to the voltage which existed at the output of said amplifier when the loom was running at its normal operating speed.

2. A warp tension controller for a loom, comprising a warp tension sensor for generating a first signal which is a measure of the warp tension, a source of a reference signal, means for comparing said signals and producing an output signal representing deviation of said first signal from said reference signal, an operational amplifier having an inverting input connected to receive said output signal, and having an output connected to means for adjusting the warp tension, and a feedback circuit connected between said input and said output of said amplifier, comprising a resistor in parallel to an integrating capacitor, wherein the improvement comprises a voltage memory having an input connected to the output of said amplifier, for producing a sustained output voltage equal to the voltage applied to its input when the loom is running and a switch which, while the loom is stopped, disconnects said capacitor from the output of said amplifier and connects it to the output of said voltage memory, to apply to said capacitor a voltage equal to the voltage which existed at the output of said amplifier when the loom was running.

4,031,924
ELECTRONIC EQUIPMENT FOR MONITORING YARN TRAVEL ON A TEXTILE MACHINE

René Domig, Kusnacht; Ernst Morf, Zurich, and Erich Loepfe, Zollikerberg, all of Switzerland, assignors to Aktiengesellschaft Gebrueder Loepfe, Wetzikon, Switzerland

Filed Apr. 8, 1976, Ser. No. 675,140
Claims priority, application Switzerland, Apr. 23, 1975, 5200/75
Int. Cl.² D03D 51/18, 51/34, 51/40
U.S. Cl. 139—336 12 Claims



1. Equipment for monitoring the yarn travel on a textile machine, comprising piezoelectrical yarn sensing means intended to be arranged at a moving part of the textile machine, and electronic receiving means intended to be mounted outside said moving part of the textile machine; said piezoelectrical yarn sensing means comprising a piezoelectrical transducer element and a yarn sensing member forming a mechanical vibratory system, and an induction coil having a winding electrically connected to the piezoelectrical transducer element; the induction coil winding and piezoelectrical transducer element constituting a first electrical resonant circuit tuned to one of the natural frequencies of said mechanical vibratory system; the electronic receiving means comprising at least one further electrical resonant circuit tuned to said natural frequency.

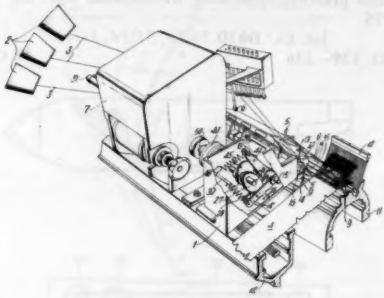
4,031,925
DEVICE FOR CUTTING THE WEFT IN A SHUTTLELESS LOOM HAVING A CONTINUOUS WEFT-SUPPLY MECHANISM

Nicola Santucci, Schio, Italy, assignor to Nuovo Pignone, S.p.A., Florence, Italy

Filed Apr. 29, 1975, Ser. No. 572,652
Claims priority, application Italy, Apr. 30, 1974, 22104/74
Int. Cl.² D03D 47/00, 47/38, 49/70
U.S. Cl. 139—429 5 Claims

1. Weft-cutting apparatus for a shuttleless loom of the type having a drive shaft and a continuous weft supply, in which a selected weft thread coming from a fixed bobbin mounted at a point spaced from the fabric prepared on said loom remains attached to the edge of said fabric during the movement of a picking needle inside rhe shed and until after said weft thread has been beaten into the fabric, comprised of an upper L-shaped lever, an oppositely disposed lower L-shaped lever, a stationary pin upon which said L-shaped levers are fulcrumed at their midpoint so that a gap is provided between said levers along the path of said selected weft thread and said levers are adapted to be pivoted about said fulcrum between open non-cutting position and closed cutting position, a first transverse cutting blade fixed to the inner end of the upper lever, a second transverse cutting blade pivoted to the inner end of the

upper lever and adapted to bear against said first transverse blade when the levers are in closed position, resilient means for urging said second transverse blade to pivot toward the first transverse blade when the levers are in closed position, a stub shaft mounted for rotation with said drive shaft, a first control cam keyed to said stub shaft, a second control cam



keyed to said stub shaft, a first roller mounted on the outer end of the upper lever to ride over the surface of the first cam, a second roller mounted on the outer end of the lower lever to ride over the surface of the second cam, and springs attached to said levers to urge said rollers against their associated cams so that said levers are pivoted from open position to closed position and return during each revolution of said stub shaft.

4,031,926

LOOM WITH MEANS FOR INTRODUCING THE FILLING THREADS BY MEANS OF A FLUID

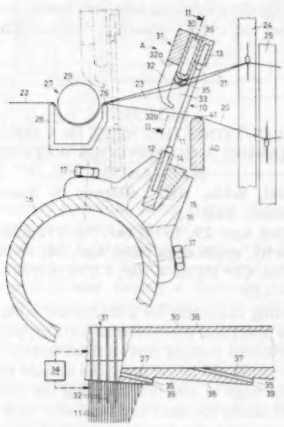
Hans Zollinger, Tann-Ruti, and Rolf Honegger, Durnten, both of Switzerland, assignors to Ruti Machinery Works Ltd., Ruti, Switzerland

Filed Sept. 8, 1975, Ser. No. 611,329

Claims priority, application Switzerland, Sept. 11, 1974, 012338/74

Int. Cl.² D03D *47/30*

U.S. Cl. 139—435 **5 Claims**



1. Loom having a means for inserting filling threads into a shed of warp threads by means of a gaseous fluid and having a reed for beating up the inserted filling threads, a supporting and drive mechanism for the reed, and temples for spreading the cloth in the width-way direction, the means for inserting the filling threads comprising a comb of parallel channel forming blades adapted to move with the reed and form a guide channel for the insertion of the filling threads by said gaseous fluid, the comb of channel forming blades being arranged on the side of the reed facing the fell of the cloth, and being carried by a slat of the reed which is remote from the supporting and drive mechanism for the reed and above the warp threads, said blades extending from the slat downwardly towards the warp threads, said supporting and drive mechanism including a shaft mounting the reed, said shaft having an axis of rotation positioned below the warp threads and forwardly of the fell so that said reed is moved through an arc which positions the channel forming blades within the warp shed during insertion of the weft and above the temples and the plane of the warp during beat-up of the weft.

4,031,927

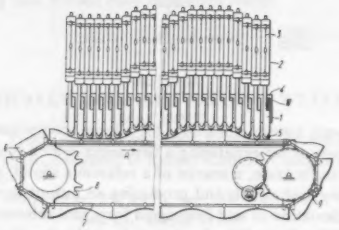
HEALD FRAME DRIVE OF THE SHEDDING MOTION OF WAVE-TYPE SHEDDING LOOMS

Jury Ivanovich Komarov, ulitsa Miklukho-Maklaya, 29, korpus 1, kv. 215; Alexei Nikolaevich Parshin, Nagornaya ulitsa, 34, korpus 1, kv. 53, and Ljubov Yakovlevna Gorbunova, Chertanovskaya ulitsa, 51, korpus 1, kv. 21, all of Moscow, U.S.S.R.

Filed Oct. 7, 1976, Ser. No. 730,462

Int. Cl.² D03D *47/26*

U.S. Cl. 139—436 **1 Claim**



1. A heald frame drive of the shedding motion of a wave-type shedding loom, comprising: guides; actuators accommodated in said guides for reciprocation in a vertical plane; heald frames secured to the top ends of respective actuators and having healds through which warp threads can be drawn; follower means carried by the bottom ends of said actuators; each said actuator having a longitudinal groove made therein; a spring accommodated in this groove; a plurality of cam plates adapted to move in a horizontal plane and be permanently engaged by said followers of respective actuators under the action of respective springs, to effect the reciprocation of said actuators jointly with said heald frames carried thereby, whereby sheds are formed of the warp threads; means for effecting the motion of said cam plates; each said spring being received in the longitudinal groove of a respective actuator so that the axis thereof is offset with respect to the vertical axis of a respective follower in the direction of movement of said cam plates.

4,031,928

STORING MEANS FOR FORMING LOOP-SHAPED YARN LENGTHS IN A TEXTILE MACHINE

Paul Gunneman, Helmond, Netherlands, assignor to Ruti-Te Strake B.V., Deurne, Netherlands

Filed Dec. 24, 1975, Ser. No. 644,185

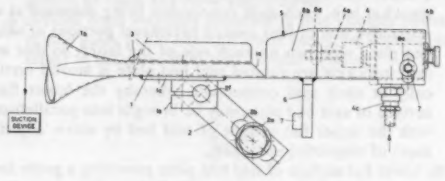
Claims priority, application Netherlands, Apr. 9, 1975, 7504245

Int. Cl.² D03D *47/36*; B65H *17/32*

U.S. Cl. 139—452 **4 Claims**

1. A storing means for forming loop-shaped yarn lengths in a textile machine, comprising a substantially flat horizontal conduit having one end connected to a suction device and the other end open and located adjacent to a blowing nozzle adapted to feed the yarn to be stored, characterized in that a

trough-like yarn-storing means is provided immediately above and substantially coextensive with said conduit, and said blowing nozzle is spaced from and directed toward the end of said



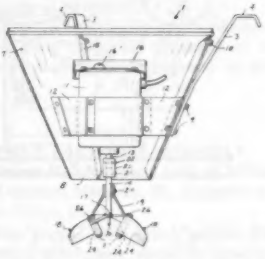
trough-like means, the axis of said nozzle extending just above the level of said conduit and at the level of said trough-like means.

4,031,929

SPREADER FOR A GRANULAR PRODUCT

Wayne E. Cobb, and Edward W. Cobb, both of 358 Harrison St., Valparaiso, Ind. 46383

Filed Feb. 12, 1976, Ser. No. 657,393
Int. Cl.[2] A01C *19/00*
U.S. Cl. 239—684 **22 Claims**



1. A spreader for spreading a flowable granular product, said spreader comprising a hopper provided with a lower substantially unobstructed outlet, elongated shaft means supported by said hopper vertically through said outlet, said shaft means having an upper extremity disposed in the hopper for connection with means for rotating the shaft means and a lower extremity, a mounting carried by said lower extremity for rotation with said shaft means, a pair of elongated curved blades which are generally curved about the longitudinal axis of said shaft means, said blades having inner ends and outer free ends, and means connecting and securing only said inner ends to said mounting for pivotal adjustment at substantially diametrically disposed locations with respect to said axis of said shaft means, the arrangement being such that when the blades are adjusted to locate their free ends closer to said axis and said shaft means, mounting and blades are rotated as a unit and a product flows through the outlet the blades will direct the product for deposit in a smaller area about said axis then when said free ends are located a greater distance from said axis.

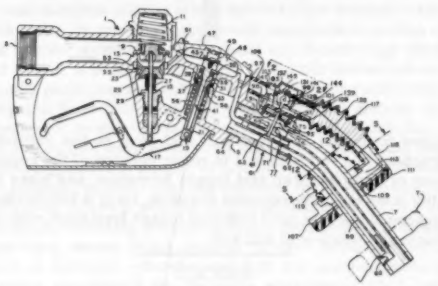
4,031,930

AUTOMATIC SHUT-OFF NOZZLE WITH LOCKABLE VAPOR RELIEF VALVE

Grenville G. Sutcliffe, Ville Ridge, and Janis Dumpis, St. Ann, both of Mo., assignors to Husky Corporation, Pacific, Mo.

Filed Feb. 9, 1976, Ser. No. 656,433
Int. Cl.[2] B65B *3/18, 57/14*
U.S. Cl. 141—207 **15 Claims**

1. In a liquid dispensing nozzle, a body having a inlet, an outlet and liquid passage means therebetween including a main valve controlling the flow of liquid from said inlet to said outlet, a spring biasing said main valve closed, a spout fixedly connected to said outlet and adapted for insertion in the inlet opening of a tank, manually actuated means for opening said main valve in opposition to said spring, Venturi means in said fuel passage means including a vacuum take-off, a vacuum chamber, means connecting said vacuum take-off to said vacuum chamber, means responsive to vacuum within said chamber caused by the flow of liquid through said Venturi means operatively connected to said manually actuated means for releasing the same and thereby permitting said spring to close said main valve, vent passage means communicating with said vacuum chamber to render said vacuum-responsive means inoperative when said vent passage means is open and having a port insertible in the tank with said spout, a normally open vent control valve in said vent passage means between



said port and said vaccum chamber, vapor conduit means adapted for sealed communication with the tank inlet opening, a pressure responsive element exposed directly to pressure in said vapor conduit means and arranged to close said vent control valve when vapor pressure in the tank and said vapor conduit exceeds a predetermined value whereby said vacuum-responsive means becomes operable to release said manually operated means and thereby permits said spring to close said main valve, and latch means engaging said pressure-responsive element to hold said vent control valve closed except when said spout is inserted in a tank and releasing the same to open responsive to full insertion of said spout in a tank, whereby to maintain vacuum in said chamber and prevent opening of said main valve except when said spout is inserted in a tank and to break the vacuum in said chamber and thereby permit said main valve to be opened while said spout is inserted in a tank.

4,031,931

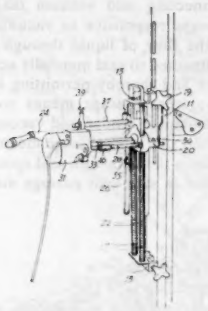
MORTISING MACHINE

Barry Vivian Balcombe, Cloverdale, Australia, assignor to Louisa Mary Balcombe, Cloverdale, Australia

Filed Nov. 12, 1975, Ser. No. 631,392
Int. Cl.[2] B27F *5/00*
U.S. Cl. 144—83 **7 Claims**

1. A mortising machine comprising: a clamping means whereby the machine may be mounted upon a workpiece; a drive motor mounted such that its drive shaft is substantially perpendicular to the working face of the workpiece; a cutting head mounted to the end of said shaft adjacent the workface; a means to support said shaft between said motor and said head, said support means also providing support for said motor, said shaft and said motor being slidably mounted to said support means, to be movable perpendicular to the workface; feeding means between said support means and said motor such that said shaft can be fed through said support means; and a guide mounted to said clamping means, to which said support means is slidably mounted, such that said support means together with said shaft are capable of movement on said guide perpendicular to that produced by said feeding

means, wherein the latter includes a screw-threaded rod rotatably mounted to said support means and constituting a threaded engagement by a housing of said motor, the end of said rod mounted to said support means having a lugged formation thereon, at least one spring-loaded pawl mounted on one of said clamping means and said guide such that, said said



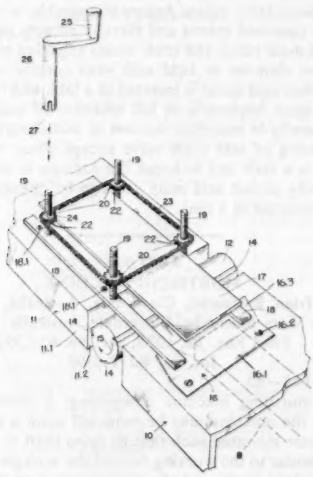
lugged formation is moved past said pawl in one particular direction, said rod is caused to rotate because of the engagement of said pawl with said lugged formation, and when the latter is moved in the opposite direction, there is only resilient engagement of said pawl with said lugged formation, with the absence of rotation of said rod.

4,031,932

PLANING ATTACHMENT FOR JOINTERS

Edgar F. Leasure, 4959 E. Lagoon Road, West Farmington, Ohio 44491

Filed June 28, 1976, Ser. No. 700,143
Int. Cl.² B27C 1/12
U.S. Cl. 144—117 R **10 Claims**



1. A board planing attachment for a jointer having a bed with a flat upper surface and a rotary cutter adjacent to one end of said bed, comprising:

a pair of flat bars connected flatwise to said upper surface to extend in spaced side-by-side relation along the normal line of board movement over said flat upper surface,

a pair of screw rods carried by each bar to extend upwardly therefrom with their axes normal to said flat upper surface, said rods being held to said bars against rotation,

four sprocket gears, each having an internally threaded hub threaded on a respective rod,

a bed plate overlying said bed upper flat surface and having an end portion overlying said cutter, said bed plate having a lower flat surface and a slide connection with each sprocket hub, each slide connection being disposed at a respective one of four spaced peripheral portions of said bed plate with two on each side of the latter, so that as said sprockets are rotated said bed plate is moved vertically at each said connection, whereby the lower flat surface of said bed plate may be brought into parallelism with the upper flat surface of said bed by screw adjustment of respective sprockets,

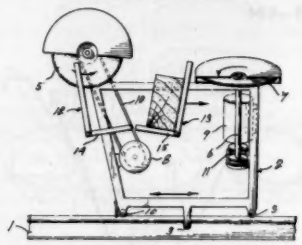
the lower flat surface of said bed plate providing a guide for the upper surface of a board slid along the upper flat surface of said bed to define a predetermined selectable distance between said lower flat surface and said cutter.

4,031,933

TENON CUTTING MACHINE WITH CIRCULAR SAWS

Ernest Piche, 2 Forget St., St. Agathe, Canada

Filed Oct. 21, 1976, Ser. No. 734,737
Int. Cl.² B27F 1/08
U.S. Cl. 144—198 R **5 Claims**



1. A tenon cutting machine for cutting skew tenon faces at an end of a piece of timber, comprising a carriage reciprocatively displaceable in a predetermined direction, a timber carrying bench operatively holding a piece of timber in a direction lengthwise orthogonally to said predetermined direction, said bench being laterally slanted in said direction at a predetermined angle of skew transversely of the piece of timber, a first circular saw blade rotatively mounted on said carriage and displaceable therewith in said predetermined direction and extending in a plane orthogonally intersecting said piece of timber at one end thereof and parallel to said predetermined direction, a second circular saw blade rotatively mounted on said carriage and displaceable therewith in said predetermined direction, said second circular saw blade extending in a plane longitudinally inclined relative to the piece of timber and intersecting said one end thereof at the longitudinal tenon angle of the desired skew tenon faces, and drive means connected to said saw blades and operatively rotating the latter for cutting into said one end of the piece of timber upon bodily displacement of said saw blades and carriage in said predetermined direction.

4,031,934

ADJUSTABLE ROUTER BIT

Rigo Stadler, 65 Hillside Ave., New York, N.Y. 10040

Filed Sept. 1, 1976, Ser. No. 719,622
Int. Cl.² B27C 5/00; B27G 13/12
U.S. Cl. 144—218 **1 Claim**

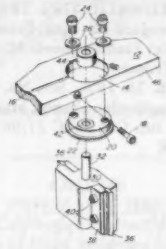
1. In a router bit having replaceable cutting blades in a cutter head secured to a rotatable shaft, a device for adjustment of the depth of cut of said cutting blades comprising:

a lengthwise oriented guide plate having a circular opening centrally located along its horizontal axis adapted to

receive a circular, rotatable plate and having a tension groove emanating from said circular opening parallel to the lengthwise axis of said guide plate;

a clamp screw threadably inserted in the leading edge of said guide plate and extending through said tension groove to open and close said groove;

a circular plate rotatably mounted in said circular opening in said guide plate, having a lower perimeter edge slightly larger in diameter than said circular opening;



said circular plate being retained in said guide plate by its lower perimeter edge and by retaining screws and washers on its upper surface;

said circular plate being able to rotate when said clamp screw is loosened and being held in a fixed position when said clamp screw is tightened;

the shaft of said router bit, being eccentrically secured to said rotatable plate such that the depth of cut of said router bit is controlled by the rotation of said circular plate.

4,031,935

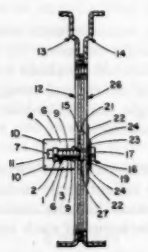
CAPTIVE FASTENER ASSEMBLY

Lary D. Jones; Robert H. van Outer, both of Lexington, Ky., and Ernest S. Kettelson, Minooka, Ill., assignors to Square D Company, Park Ridge, Ill.

Division of Ser. No. 597,062, July 18, 1975, Pat. No. 3,986,544. This application Apr. 21, 1976, Ser. No. 678,786

Int. Cl.² F16B *5/02, 39/00*

U.S. Cl. 151—41.76 **1 Claim**



1. A captive fastener assembly comprising a two-piece fastening device, including first and second fastening members, said first and second fastening members being engageable for fastening and separable for unfastening, first and second captivating means, wherein said first fastening member includes a threaded shank extending from a first end and a radially enlarged head formed at the opposite second end, said radially enlarged head includes a pair of radially extending slots opening to diametrically opposite sides of the periphery of said head, said first captivating means includes a pair of spaced apart parallel guide rails defining a passageway therebetween, the respective inner edges of said guide rails facing said passageway being slidably received in respective ones of said pair of slots in said head of said first fastening member, said threaded shank being positioned in said passageway when said guide rails are slidably received in said slots, said threaded shank being then held substantially parallel to said guide rails for reciprocating movement between an fastening and an unfastening position, said second fastening means includes an internally threaded nut, a washer axially aligned with said nut and secured to one side thereof, said threaded shank of said first fastening member being threadably engageable with said internally threaded nut, said second captivating means includes a bracket member having an inner surface to face a work piece when secured thereto, a pair of substantially flat mounting ears projecting laterally from each opposite end of said bracket, an intermediate portion of said bracket spaced outwardly from the plane of the inner surface of said laterally projecting mounting ears, the inner surface of said intermediate portion being spaced from the inner surfaces of said laterally projecting mounting ears a distance slightly greater than the thickness of said washer to permit rotation thereof while restraining substantial reciprocal movement of said washer in an axial direction relative to said bracket when secured to said work piece, an opening through said intermediate portion of said bracket member to receive said nut therethrough when said washer is positioned adjacent said inner surface of said laterally projecting mounting ears, said nut being sufficiently elongated to project outwardly of said bracket member for engagement by external means to rotate said nut, including a first and second work piece to be fastened together, said first captivating means is secured to said first work piece with said first fastening member operably mounted therein, said second captivating means is secured to said second work piece with said second fastening member operably mounted therein, said captivating means being secured to said respective work pieces at locations whereby said first and second fastening members are aligned for fastening engagement when said work pieces are in position for fastening, opening means through said first and second work pieces to permit communication between said first and second fastening members when aligned for fastening engagement, wherein said pair of guide rails of said first captivating means are at least as long as said first fastening member including the combined length of said threaded shank and said head, and fastener dismounting means to enable removal of said first fastening member from said first captivating means and re-installation of said member in said first captivating means, including an integrally formed cross-arm member extending across said passageway and between said pair of guide rails at the end thereof remote from the portion securable to said work piece, said fastener dismounting means comprising a recess in one of said guide rails opening to said passageway adjacent said cross-arm member, the configuration and dimension of said recess conforming to the cross-sectional configuration and dimension of the head of said first fastening member to enable the portion of said head adjacent said recess to rotatably pass through said recess for removal of said member from said captivating means and re-installation therein.

4,031,936

PREASSEMBLED SPRING WASHER FASTENER UNIT

Gary Martin Curtis, Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

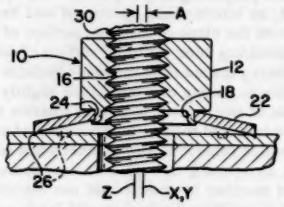
Filed Nov. 14, 1975, Ser. No. 632,118

Int. Cl.² F16B *39/24*

U.S. Cl. 151—37 **1 Claim**

1. A preassembled locking fastener unit inlcuding a nut member with a threaded bore formed therein, a compressible, generally conical spring washer with a substantially circular outer periphery and substantially circular, uninterrupted inner periphery formed by an aperture therein, the outer periphery being concentric with the uninterrupted inner periphery, a generally annular means formed on the clamping surface of the nut with a central axis offset laterally from the central axis of the threaded bore of the nut, the outer periphery of the washer member including locking teeth means to retard free

movement of the washer relative to a work surface when associated therewith, the clamping surface of the nut further including a plurality of teeth integral therewith and spaced circumferentially about the axis of the threaded bore and positioned to overlie the inner marginal surface of the washer member, each tooth including a locking surface extending substantially perpendicular to the clamping surface of the nut and a camming surface, the associated inner marginal surface of the washer including locking recesses including camming surfaces and locking surfaces complementary to the camming



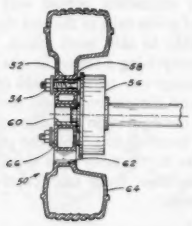
and locking surfaces of the teeth on the clamping surface of the nut wherein the substantially perpendicular surfaces are forward when the nut member is rotated in a tightening direction to urge the washer to rotate therewith in said tightening direction creating visible scribe marks in the workpiece, while the camming surfaces allow relative rotation between the washer and nut when the nut is rotated in an untightening direction but in such a manner that the washer is forced to move laterally across the workpiece thereby resisting unauthorized loosening of the joint formed thereby.

4,031,937

UNITARY TIRE-WHEEL

Edward J. Georgia, Los Altos, Calif.; Russell K. H. Eggers, Baltimore, and Ernest L. Molnar, Timonium, both of Md., assignors to Zedron, Inc., Baltimore, Md.

Filed June 2, 1975, Ser. No. 582,624
Int. Cl.² B60B 9/22
U.S. Cl. 152—9 **6 Claims**



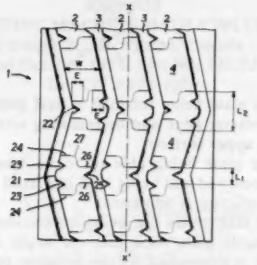
1. A one-piece inflatable tire-wheel having a pneumatic tire portion including a crown portion and a pair of spaced apart sidewalls which cooperatively define a toroidal air chamber coextendant thereabout, a wheel portion including a central hub and a pair of spaced apart sidewalls, each of said sidewalls of said wheel portion being integral with one of said sidewalls of said tire portion and extending therefrom to said central hub and being integral with said central hub, said sidewalls of said wheel portion defining a continuous air chamber therewithin and interconnecting said central hub and said pneumatic tire portion as a unitary one-piece tire-wheel, said air chamber of said tire portion opening into said air chamber of said wheel portion and providing unitary and continuous inflatable air chamber means within said tire-wheel for receiving pneumatic pressurization in maintaining the structural integrity of said tire-wheel to provide a pneumatically sustained tire-wheel, said wheel portion including a plurality of hollow structural reinforcing tie members disposed intermediate said central hub and said pneumatic tire portion, said tie members including wall portions integral with and extending between said sidewalls of said wheel portion in a manner to restrict lateral deformation thereof, and valve means for inflation of said air chamber means of said inflatable tire-wheel to the desired pneumatic pressure.

4,031,938

PNEUMATIC TIRE TREAD

Henri Verdier, Beauregard-l'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, France

Filed Feb. 26, 1976, Ser. No. 661,800
Claims priority, application France, Mar. 4, 1975, 75.06814
Int. Cl.² B60C 11/06
U.S. Cl. 152—209 R **3 Claims**



1. A pneumatic tire with a radial carcass reinforcement which is provided with a tread having circumferential ribs separated by circumferential grooves, said ribs having walls which follow a broken-line outline forming salient and reentrant angles, characterized by the fact that said ribs have:

a. a salient angle recess on each side of and near each said salient angle;

b. two salient angle incisions for each said salient angle wherein each said incision has a length less than half of the width of the rib and being, with respect to each said salient angle, on the outside and near each said salient angle recess;

c. a reentrant angle recess in each said reentrant angle;

d. two reentrant angle incisions for each said reentrant angle wherein each said incision has a length less than half of the width of the rib and being, with respect to each said reentrant angle, on the outside and near each said reentrant angle recess;

and by the fact that

e. the distance measured in the circumferential direction between the two salient angle incisions of each said salient angle is greater than the distance between the two reentrant angle incisions of each said reentrant angle.

4,031,939

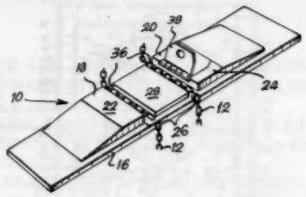
TIRE CHAIN APPLYING DEVICE

Joseph De Martini, 3728 Canyon Way, Martinez, Calif. 94553

Filed Nov. 11, 1975, Ser. No. 630,922
Int. Cl.² B60C 27/00; E02C 3/00
U.S. Cl. 152—213 R **5 Claims**

1. A device for applying a tire chain to the tire of a vehicle comprising an elongated base member adapted to support the wheel of a vehicle, a pair of wheel mounting elements on said base member in longitudinally spaced relation defining a recess therebetween, a central chain spacing member mounted movably on said base member intermediate said wheel mounting elements and within said recess, means on said spacing member and base member cooperable to selec-

tively slide said spacing member longitudinally within said recess and thereby define at least one transverse chain-receiving slot between said spacing member and said wheel mounting elements.

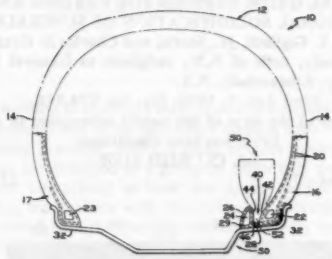


4,031,940

PNEUMATIC TIRE

Donald R. Bartley, Cuyahoga Falls, and Robert F. Jones, Westfield Center, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Feb. 21, 1975, Ser. No. 551,769
Int. Cl.² B60C 15/00
U.S. Cl. 152—362 R 4 Claims



1. In a pneumatic tire adapted for combination with an emergency use device with an anchoring means therewith for disposing said device internally of the tire, which tire includes a pair of axially spaced annular bead portions, the improvement wherein the tire comprises

A. a pair of axially spaced, inextensible, circular bead members embedded within one of the bead portions, and

B. an arcuate, anchoring channel for mounting the device within the tire, said anchoring channel being

1. formed in the one bead portion,
2. located between the bead members and
3. contoured to receive the anchoring means of the device.

4,031,941

CONCENTRIC CONTRA-ROTATING BEAD DEFLECTOR MECHANISM FOR TIRE MOUNTING APPARATUS

S. W. Malinski, Tamaroa, Ill., and Thomas L. Mueller, St. Louis, Mo., assignors to S. W. Malinski, Tamaroa, Ill.

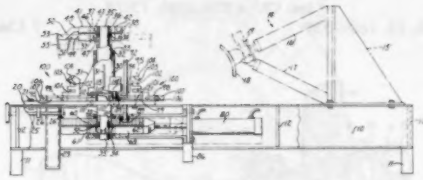
Filed Feb. 17, 1976, Ser. No. 658,600
Int. Cl.² B60C 25/06
U.S. Cl. 157—1.17 8 Claims

1. In tire mounting apparatus of the type in which two bead-deflecting arms are rotated simultaneously in opposite senses, the improvement comprising

platform means having a fixed vertical sleeve, an outer tubular shaft therein and projecting thereabove and therebelow, and a central shaft within the outer shaft and projecting above and below it,

a radial arm secured to the upper end of the central shaft, a second radial arm secured therebeneath to the upper end of the outer shaft, and vertical offset means to position their radially outer arm ends in the same plane,

tire bead deflectors secured to said radially outer ends,



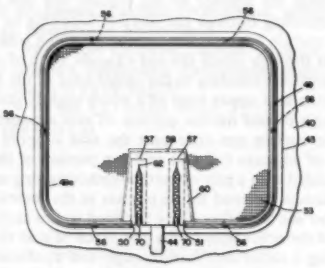
gears secured on the lower end of the outer shaft and therebeneath on the projecting portion of the central shaft, and means meshing with said gears to drive said shafts in opposite senses.

4,031,942

WINDOW SCREENS FOR VANS AND THE LIKE

Warren E. Shelton, Cleveland, Ohio, assignor to Van-Camper Corporation, Cleveland, Ohio

Filed Dec. 15, 1975, Ser. No. 640,708
Int. Cl.² E06B 3/32
U.S. Cl. 160—103 3 Claims

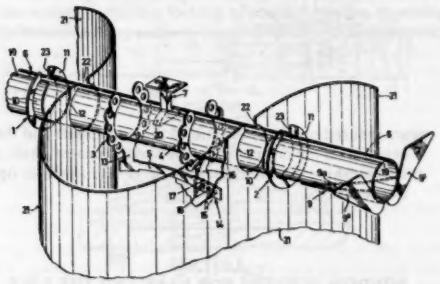


1. A screen for use in combination with an openable window mounted within a window opening in a van or like vehicle and having a window manipulating handle affixed to the window adjacent one edge thereof and projecting inwardly of the opening, said screen comprising a rigid frame conforming to the periphery of the window opening for reception thereabout inward of the window, said frame having a pair of spaced ends aligned with each other for positioning to the opposite sides of the window handle upon a positioning of the screen about the window opening, said screen further including flexible wire screening having a peripheral edge secured to said frame peripherally about the frame and covering the area bounded by the frame, slot means through the edge of the screening between the spaced ends of the frame and alignable with the window handle for access thereto, said slot means extending inwardly from the edge of the screening for only a portion of the width of the screening, at least one piece of flexible material secured to said screening in overlying relationship to said slot means, said flexible material having an outer edge extending between the spaced ends of the frame, said piece of material having spaced slits therein paralleling and overlying said slot means and extending inwardly from the outer edge of the material, and a pair of zipper assemblies mounted on said piece of material with one zipper assembly associated with each slit for a selective opening and closing thereof, the portion of the flexible material between the zipper assemblies, upon an opening of both zipper assemblies, defining an access for the window handle, said flexible material and zipper assemblies, when closed, being inwardly flexible to accommodate the inwardly projecting window handle.

4,031,943
SYSTEM FOR HANGING CURTAINS

Sabino Silvestre, Madrid, Spain

Filed May 3, 1976, Ser. No. 682,786
Int. Cl.² A47H 1/00, 13/14
U.S. Cl. 160—330 7 Claims



1. In a system for hanging gathered curtains: a horizontal tubular suspension rod having a longitudinal slot running the length of the upper side of the tubular rod; means for supporting the tubular rod from a fixed surface including at least one intermediate support member having an enlarged portion housed within the interior of the tubular rod and a narrow portion extending through the slot for fastening to the fixed surface; a curtain having a top portion provided with a plurality of holes through which the rod extends, each of said holes having a portion extending to the upper edge of the curtain to form a slot in said upper edge of a width slightly greater than the thickness of said narrow portion of said support member so that the curtain can slide past the said support member; each pair of adjacent holes in said top portion of the curtain being provided with a pair of curtain-gathering ring assemblies one of which is fastened to the curtain at the location of one of the holes and the other being fastened to the curtain at the location of the other hole of the pair, each of said ring assemblies having a radial slot therethrough and conforming to its respective curtain hole; and linking means of adjustable length connecting one ring assembly with the other of the pair.

4,031,944
DEVICE FOR OPENING AND CLOSING OF CORD OPERATED CLOSURES

Howard J. Morrison, Deerfield, and Derek A. Brand, Naperville, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

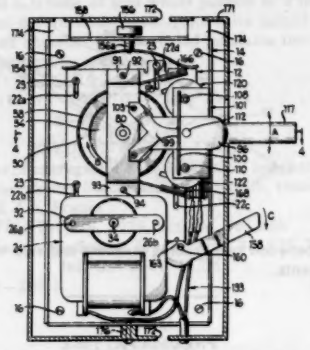
Filed Aug. 11, 1975, Ser. No. 603,342
Int. Cl.² A47H 5/02; B66D 1/76
U.S. Cl. 160—331 20 Claims

1. An opening and closing device for cord operated closures having a pair of cords or a pair of cord runs, one cord or cord run for opening the closure and the other cord or cord run for closing the closure, comprising:

a frame structure;

a unidirectional motor mounted on the frame structure, including drive means for engaging and longitudinally driving either one of said cords; and

direction determining means for selective closing or opening of the closure, said direction determining means being movably mounted on said frame structure for engaging

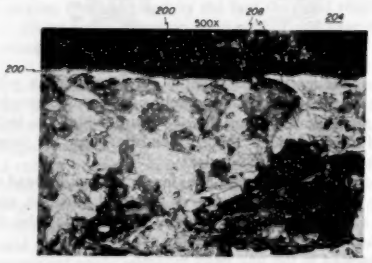


either one of said cords and bringing said cord into driving engagement with said drive means.

4,031,945
PROCESS FOR MAKING CERAMIC MOLDS HAVING A METAL OXIDE BARRIER FOR CASTING AND DIRECTIONAL SOLIDIFICATION OF SUPERALLOYS

Michael F. X. Gigliotti, Jr., Scotia, and Charles D. Greskovich, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 7, 1976, Ser. No. 674,548
The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.
Int. Cl.² B22D 21/06
U.S. Cl. 164—72 23 Claims



1. A method for forming a barrier layer at the mold-metal interface in a mold suitable for the casting and directional solidification of superalloys therein including the process steps of:

placing a mold made of a material comprising a first refractory oxide bonded together by silica within a furnace;

introducing a controlled prevailing atmosphere into the furnace;

heating the mold in the controlled prevailing atmosphere at an elevated temperature for a sufficient period of time to dissolve some of the first refractory oxide into the silica;

casting a melt of superalloy metal into a cavity of the mold, and

forming a barrier layer comprising a second refractory oxide by the oxidation of at least one constituent of the superalloy within the mold in integral contact with the first refractory oxide material, the barrier layer having a surface defining at least a portion of the interior wall surfaces of the cavity into which the superalloy melt is cast and comes into contact therewith, and having a thickness greater than 1 micron to substantially prevent

the molten metal from penetrating into the mold structure and the microstructure of the mold in the vicinity of the cavity exhibiting a substantially porous free structure containing silica bearing phases therein in contact with the barrier layer.

4,031,946

METHOD AND APPARATUS FOR CHANGING THE SECONDARY COOLING DURING CONTINUOUS CASTING OF STEEL

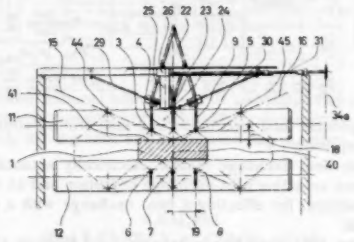
Heinrich Marti, Forch; Andreas Zogg, Zug, and Oskar Hardegger, Hirzel, all of Switzerland, assignors to Concast AG, Zurich, Switzerland

Filed Feb. 20, 1975, Ser. No. 551,103

Claims priority, application Switzerland, Feb. 28, 1974, 2815/74

Int. Cl.² B22D *11/124*

U.S. Cl. 164—89 **9 Claims**



1. A method of cooling a steel strand of substantially rectangular cross-section in the secondary cooling zone of a continuous casting machine, wherein spray nozzles having operating positions are arranged in a group of essentially parallel rows, each row comprising at least two spray nozzles, said rows extending transversely with respect to the direction of travel of the strand, the spray nozzles emitting cooling agent to form substantially adjoining cooling agent patterns on the strand surface, the improvement comprising the steps of: synchronously groupwise altering the distance of said nozzles from said strand surface and at the same time groupwise altering the distance between said nozzles of a row in dependency upon a change in the strand format, the distance of the nozzles of a row from the strand surface and between each other being altered such that the operating positions of each nozzle lie along a substantially straight line which intersects with the strand surface, whereby the cooling agent patterns on the strand surface remain in a substantially adjoining position with respect to each other.

4,031,947

METHOD AND APPARATUS FOR SLUG CASTING

John E. Connolly, Wyoming, Mich., assignor to Walter W. Nichols, Hickory Corners, Mich., a part interest

Filed Oct. 8, 1975, Ser. No. 620,766

Int. Cl.² B22D *13/00, 5/02*

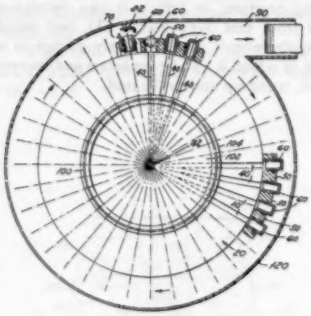
U.S. Cl. 164—114 **8 Claims**

1. In a method of continuous casting of individual castings in a system which includes revolving a plurality of radially disposed molds around an axis of revolution and distributing molten metal to said molds from a source on said axis of revolution, that improvement which comprises:

a. mounting said plurality molds circumferentially around said axis of revolution along a transverse axis of each mold wherein each of said plurality of molds can be moved to a fill position and later to a dump position while revolving continuously about the axis of revolution,

b. retaining the molds in a fill position while being filled with molten metal and cooled,

c. causing said molds to move to an inverted position while still revolving about said axis of revolution wherein the chilled casting is dumped, and



d. utilizing the inertial force of the dumped revolving casting to move it to a conveyance area away from the casting system.

4,031,948

MOLD-EQUIPPED CASTING OVEN UNIT FOR CONTINUOUS ROD CASTINGS

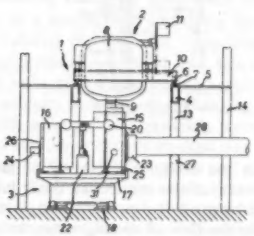
Bernhard Bergmann, Balsthal, Switzerland, assignor to Von Roll AG, Gerlafingen, Switzerland

Filed June 13, 1975, Ser. No. 586,842

Claims priority, application Switzerland, June 15, 1974, 8203/74; Jan. 17, 1975, 545/75

Int. Cl.² B22D *11/10, 11/128*

U.S. Cl. 164—281 H **4 Claims**



1. In a continuous rod casting equipment line for horizontally forming and pulling one or more rod stems, a mold and oven unit, comprising, in combination:

reservoir oven means (2) for intermittently receiving quantities of casting melt and controllably discharging the casting melt downwardly in molten condition;

mold assembly means composed of at least two individual mold assemblies (15,16), each provided with a continuous-casting chill mold (23,24) and forming therewith an antechamber for the mold, said mold being assembled as part of said mold assembly so as to form a side of said antechamber and to provide for continuous casting in a manner in which the cast material moves horizontally out of the mold, said antechamber formed by said mold assembly being capable of containing a quantity of melt for the mold sufficient for assuring continuity of the casting operation while the mold assembly is supplied with melt from said reservoir oven means (2), and

a positioning turntable (17), having a base (18) providing a rotatable mount therefor and having a plurality of locations at which the respective mold assemblies are fixably mountable on the rotatable part of said turntable (17), said turntable being mounted on its said base so as to be

rotatable between a plurality of predetermined orientation positions in each of which one of said mold assemblies mounted on said table is placed in a predetermined operating position, in which it can receive melt discharged from said oven means (2), and another mold assembly thereon is simultaneously placed in a standby position, in which it can be replaced and its replacement mounted, trued up and preheated.

4,031,949

WATER COOLED MOLD FOR THE CONTINUOUS CASTING OF METALS

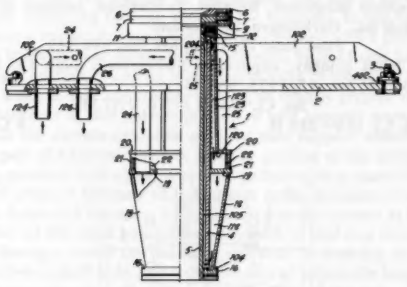
Piero Colombo, 27, Via Leopardi, Udine, Italy

Filed Apr. 23, 1976, Ser. No. 679,316

Claims priority, application Italy, Apr. 28, 1975, 12587/75

Int. Cl.² B22D *11/02*

U.S. Cl. 164—283 M **1 Claim**



1. A mold for the continuous casting of molten metals comprising an inner tubular mantle, an outer tubular mantle surrounding said inner tubular mantle leaving between them a cooling jacket for the flow of cooling water, an outer, funnel shaped mantle surrounding the said outer mantle of the mold from the lower end of the mold up to substantially one half of its height, defining in cooperation with the outer mantle of the mold a cooling water inlet manifold chamber the cross sectional area of the flow passage of which is progressively decreasing from its upper end to its lower end, communication ports formed in the said outer tubular mantle of the mold placing in communication the lower end of said water inlet manifold chamber with the lower end of said cooling jacket of the mold, cooling water supply pipes communicating with the upper end of said water inlet manifold chamber, a second, funnel shaped mantle surrounding the upper end of the mold, and defining in cooperation with the outer mantle of the mold a a water outlet manifold chamber, the cross sectional area of the flow passage of said water outlet manifold chamber being progressively increasing from its upper end to its lower end, communication ports formed in the said outer tubular mantle of the mold placing in communication the upper end of said water outlet manifold chamber with the upper end of said cooling jacket of the mold, and communication ports formed in the lower end of said water outlet manifold chamber placing in communication said water outlet manifold chamber with a water exhaust chamber communicating with the used cooling water exhaust pipes of the continuous casting plant.

4,031,950

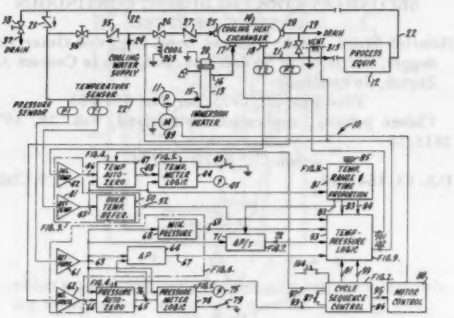
PROCESS FLUID CIRCULATION AND TEMPERATURE CONTROL SYSTEM

Gilbert F. Shultz, Novi, Mich., assignor to Application Engineering Corporation, Elk Grove Village, Ill.

Filed Feb. 17, 1976, Ser. No. 658,350

Int. Cl.² G05D *27/00*

U.S. Cl. 165—31 **21 Claims**



1. A process fluid circulation and temperature control system comprising:

a main heat exchange means, electrically actuatable between an active heat-exchange condition and an inactive condition, for effecting a heat exchange with a process fluid;

a pump for circulating a process fluid through the heat exchange means and through an external process apparatus that utilizes the process fluid to effect a second heat exchange;

a thermal sensor for sensing the temperature of the process fluid at a given point on its circulation path;

temperature control circuit means, coupled to the thermal sensor and to the heat exchange means, for actuating the heat exchange means between its active and inactive operating conditions in response to changes in the temperature of the process fluid;

a delivery pressure sensor for sensing the pressure of the fluid delivered to the process apparatus to develop a delivery pressure signal;

a return pressure sensor for sensing the pressure of the fluid returned to the pump to develop a return pressure signal;

and pressure differential control circuit means, coupled to both pressure sensors and to the temperature control circuit means, for inhibiting actuation of the heat exchange means to its active condition except in the presence of a differential of predetermined sign and amplitude between the delivery pressure signal and the return pressure signal.

4,031,951

AIR CLIMATIZING DEVICE

Peter Engler, Mosbach, Germany, assignor to Luwa AG, Zurich, Switzerland

Filed Nov. 13, 1974, Ser. No. 523,549

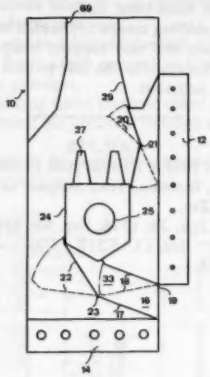
Claims priority, application Switzerland, Nov. 21, 1973, 16447/73

Int. Cl.² G05D *23/00*; F28F *27/02*

U.S. Cl. 165—103 **15 Claims**

1. An apparatus for controlling the flow of air in an air climatizing device, comprising a housing having means defining air throughpassages, a plurality of flap members for controlling said air throughpassages, an adjustment motor and transmission means for actuating the flap members in a predetermined sequence, said transmission means comprising a plurality of relatively movable gears which are in continual power transmission-meshing engagement with one another

during operation of the apparatus and entrainment elements cooperating with predetermined ones of said gears at predetermined regions thereof, means for drivingly connecting each



entrainment element with each of its associated flap members in a respective position of each said entrainment element for positively driving each said associated flap member.

4,031,952

HEAT ENERGY ACCUMULATOR

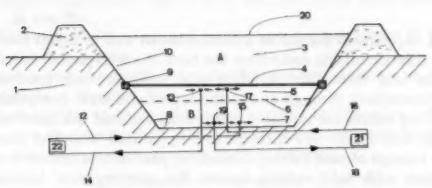
Bernard Contour, Residence "Les Petits Princes" 27, rue Jacques Lemercier, Versailles (Les Yvelines), France

Filed Jan. 13, 1975, Ser. No. 540,729

Claims priority, application France, Jan. 15, 1974, 74.01218; Feb. 12, 1974, 74.04736

Int. Cl.² F01K *1/10*

U.S. Cl. 165—104 S **8 Claims**



1. A system for accumulating and storing heat energy comprising:

means defining a container having bottom and side walls;

a horizontally extending diaphragm disposed above the bottom wall of the container and separating the container into an upper compartment and a lower compartment, said lower compartment being filled with heated water;

the upper compartment being filled with a heavy mass sufficient to apply a uniform pressure to the diaphragm and to the heated water in the lower compartment, said pressure being of a magnitude which is no less than that exerted on the diaphragm by the water in the lower compartment;

first fluid circuit means for communicating the water in the lower compartment with a heat source to circulate water between the lower compartment and the heat source;

second fluid circuit means for communicating the water in the lower compartment with a heat sink to circulate hot water from the lower compartment between it and the heat sink;

said lower compartment, first fluid circuit and second fluid circuit comprising a closed fluid circuit in which the mass of water is constant.

4,031,953

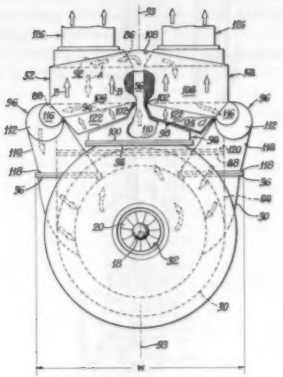
HEAT EXCHANGER SYSTEM AND DUCTING ARRANGEMENT THEREFOR

Jan C. Kline, Brimfield, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 23, 1974, Ser. No. 535,877

Int. Cl.² F02C *7/10*; F02G *1/00*; F28F *9/26*, *3/08*

U.S. Cl. 165—166 **2 Claims**



1. A heat exchanger system and ducting arrangement therefor for transferring heat from a first fluid emanating from a first passage to a second fluid emanating from a second passage and circulating therethrough, comprising:

pair of longitudinally oriented and side-by-side heat exchanger units individually having a plurality of first and second primary surface heat exchanging plate assemblies alternately arranged in a generally upright, transversely oriented and longitudinally stacked manner and defining a plurality of first fluid flow paths and a plurality of second fluid flow paths alternately therethrough and so constructed and arranged that an elongated space is defined between said units for substantially the full length thereof:

a bifurcated inlet duct for delivering the first fluid upwardly from said first passage to said heat exchanger units and said first fluid flow paths, and including a pair of longitudinally extending channels individually connected upwardly to said heat exchanger units;

a pair of exhaust conduits for conducting the first fluid upwardly away from said heat exchanger units after heat is extracted therefrom;

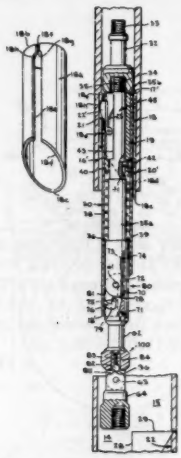
a common inlet plenum including a cover spanning between said heat exchanger units generally above said elongated space, a pair of end walls spanning between the ends of the heat exchanger units, and a centrally disposed duct connected to the heat exchanger units, said centrally disposed duct being longitudinally interposed between said channels and of a construction sufficient for delivering the second fluid oppositely from said second passage upwardly to said elongated space and therefrom in two separate directions symmetrically oppositely outwardly to said heat exchanger units and to said second fluid flow paths; and

a pair of outlet manifolds for conducting the heated second fluid from said heat exchanger units.

4,031,954
FLOW VALVE INSTALLATION AND REMOVAL APPARATUS

Gerald P. Herbert; Ferdinand M. McGinn, and Hugh D. Embree, all of Lafayette, La., assignors to Production Specialties, Inc., Lafayette, La.

Filed Sept. 13, 1976, Ser. No. 722,534
Int. Cl.[2] E21B *23/00*
U.S. Cl. 166—117.5 5 Claims



1. A well installation comprising:

a. a well tubing having a plurality of tubing mandrels each having a main bore therethrough with an orientation sleeve mounted in the main bore and a valve receiving side pocket offset from the main bore, said orientation sleeve including:

1. an elongated hollow tubular body having an upper and lower end;

2. said lower end extending upwardly at an angle relative to the longitudinal axis of said tubular body to form a sloping guide surface which extends upwardly and away from the offset pocket;

3. a first slot extending longitudinally of said tubular body from the highest portion of said guide surface, said first slot terminating in spaced relation to said upper end of said tubular body;

4. a second slot extending from the upper end of said first slot to the upper end of said tubular body; and

5. said second slot being substantially smaller in width than said first slot to form a pair of aligned shoulders at the juncture of said first and second slot which are spaced from each other by said second slot whereby debris may discharge from said first slot through said second slot and into the tubing;

b. guard and guide means above the valve receiving side pocket and including spaced sides facing the main bore and having vertical edge surfaces and an inner upwardly tapered end to guide a valve into the valve receiving side pocket;

c. a support body adapted to be moved through the tubing mandrels;

d. a movable body carried by and longitudinally movable relative to the support body;

e. a longitudinal guide key having an upwardly directed shoulder and an inclined surface facing downwardly, pivotally carried by said movable body for outward movement from said movable body and movable downwardly through said sleeves but an upward movement of said movable body engagable with the lower end of any sleeve immediately thereabove to slide along said first slot means and engage said aligned shoulders;

f. shifting tool means pivotally supported from said support body and adapted to support a valve handling support;

g. cooperating releasing means on said support body and movable plunger initially holding said shifting tool means aligned in the main bore; and

h. cooperating shifting means connected between said shifting tool means and said support body for shifting said shifting tool means into the side pocket when the releasing means is actuated.

4,031,955
DOWN HOLE INHIBITOR INJECTOR

Charles A. Ledet, Houston, Tex., assignor to Baker Oil Tools, Inc., Houston, Tex.

Filed Jan. 20, 1976, Ser. No. 650,741
Int. Cl.[2] E21B *33/12*
U.S. Cl. 166—183 14 Claims

1. Apparatus for use in a subterranean well to inject inhibitor solution within and below the bore of a well packer mechanism and thereafter circulate said solution with produced hydrocarbons through and to the top of said well, comprising: valving means for selective transmission of said inhibitor solution within said well through said apparatus; mandrel means for receipt of said valving means; by-pass means in communication with said valving means for carrying said inhibitor solution therethrough; tubular means having first and second tubing, said first tubing defining a flow path in communication with said by-pass means for carrying said inhibitor solution, and said second tubing defining a flow path for fluid transmission to the top of the well; and well packer means for receipt of said first and second tubing, said packer means defining therein a flow path communicating with the flow path defined within said first tubing whereby said inhibitor solution is exposed to and circulated within the flow path in said packer means and in communication with the flow path defined in said second tubing.

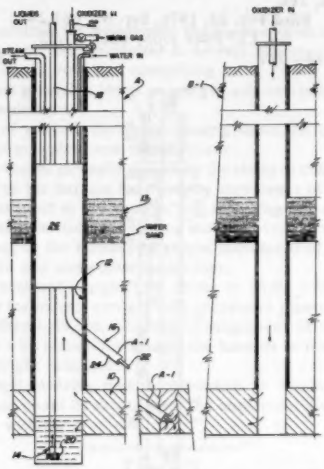
4,031,956
METHOD OF RECOVERING ENERGY FROM SUBSURFACE PETROLEUM RESERVOIRS

Ruel C. Terry, Denver, Colo., assignor to In Situ Technology, Inc., Denver, Colo.

Filed Feb. 12, 1976, Ser. No. 657,550
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—261 6 Claims

1. A method of extracting heat from a petroleum reservoir in the earth by consuming the petroleum in situ comprising the steps of:

establishing at least two injection passages and a removal passage between a surface location and the petroleum reservoir,
injecting an oxidizer through one of the injection passages into the petroleum reservoir,
igniting the petroleum reservoir through said one passage to create a fire front which progresses toward the other of said injection passages,
injecting an oxidizing agent into said other injection passage while maintaining the injection through said one injection passage,
allowing channels to be formed in the petroleum reservoir by burning petroleum,



injecting a plugging agent into the most rapidly forming channels,
controlling oxidizer injection so that petroleum is consumed in the fire,
collecting fluids produced by the burning petroleum in the removal passage,
conveying the fluids through the removal passage to the surface location, and
forming an underground burn pattern by injection of a non-flammable fluid into the reservoir at locations where it is desired to discourage further burning.

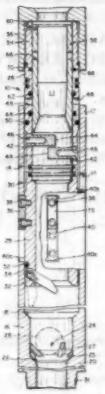
4,031,957

METHOD AND APPARATUS FOR TESTING AND TREATING WELL FORMATIONS

Lawrence Sanford, 4047 Hollister, Houston, Tex. 77055

Filed July 23, 1976, Ser. No. 708,029
Int. Cl.² E21B *43/00, 43/27, 47/00*
U.S. Cl. 166—264 **26 Claims**

1. A single trip method of treating a formation in a well bore comprising:
lowering into said well bore an operating tool string having a packer, a perforated shoe supported below said packer, a first valve means supported above said packer and a second valve means supported above said first valve means;
setting said packer above said formation,
manipulating said first valve means to open a flow passage for circulation downwardly through said string, said first and second valve means, said packer and said shoe to said formation, and upwardly from said formation through said shoe, said packer, said first and second valve means and said string for testing said formation.
manipulating said first vavle means to prevent flow upwardly or downwardly therethrough,
manipulating said second valve means to open a first lateral flow path providing communication from the interior of said tool string to said well bore,
reverse circulating a fluid through said first lateral flow path to remove foreign matter,
manipulating said second valve means to close said first lateral flow path,
manipulating said first valve means to open said flow passage,
introducing a treating fluid into said formation,
manipulating said first valve means to prevent flow upwardly or downwardly therethrough,
manipulating said second valve means by longitudinal movement of said tool string to open a second lateral flow path providing communication from the interior of said tool string to said well bore, and
reverse circulating a fluid through said second flow path to remove foreign matter.



21. Apparatus adapted for attachment to a tool string to be lowered into a well bore for treating a formation in said well bore comprising a packer, a perforated shoe supported below said packer, first conduit means connecting said perforated shoe and said packer, first valve means supported above said packer, second conduit means connecting said first valve means and said packer, second valve means supported above said first valve means, third conduit means connecting said first and second valve means, said first valve means being operative to selectively provide a flow passage for circulation downwardly through said first and second valve means, said packer to said shoe and upwardly from said shoe through said packer and said first and second valve means, said second valve means including means to provide a first lateral flow path from the interior of said second valve means to said well bore and means to provide a second lateral flow path from the interior of said second valve means to said well bore when said first lateral flow path is closed and said tool string is moved longitudinally.

4,031,958

PLUGGING OF WATER-PRODUCING ZONES IN A SUBTERRANEAN FORMATION

Burton B. Sandiford, Placentia, and Robert K. Knight, Fullerton, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed June 13, 1975, Ser. No. 586,731
Int. Cl.² E21B *33/138*
U.S. Cl. 166—270 **25 Claims**

1. A method for selectively plugging the permeable water channels of a subterranean formation of nonuniform permeability penetrated by a well, which comprises:

a. introducing a polymer-thickened aqueous solution of a first reactive chemical into said well communicating with said formation, said solution containing a polymer thickening agent added in an amount sufficient to render the solution substantially more viscous than the subsequently injected liquids;
b. followed by introducing a low viscosity inert aqueous spacer liquid into said well;
c. followed by introducing a low viscosity aqueous solution of a second reactive chemical which, in the formation, contacts and reacts with said first reactive chemical to produce an insoluble precipitate or gel;
d. followed by introducing a second low viscosity inert aqueous spacer liquid; and
e. followed by introducing a second aqueous solution of said first reactive chemical which, in the formation, contacts and reacts with the aqueous solution of a second reactive chemical introduced in step (c) to produce an insoluble precipitate or gel.

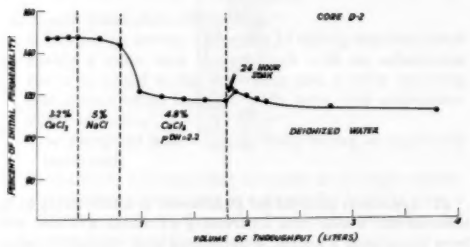
4,031,959
METHOD OF MAINTAINING THE PERMEABILITY OF HYDROCARBON RESERVOIR ROCK

James H. Henderson, Dallas, Tex., assignor to Permeator Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 647,769, Jan. 9, 1976, abandoned, which is a continuation of Ser. No. 542,297, Jan. 20, 1975, abandoned. This application July 7, 1976, Ser. No. 703,216

Int. Cl.² E21B *43/04, 43/26, 43/27*

U.S. Cl. 166—307 **11 Claims**



1. A method of maintaining and stabilizing the permeability of subsurface hydrocarbon reservoir rock containing clay particles and, where clay damage has occurred, of improving the permeability of the rock, said method comprising:
a. injecting down a well bore traversing said rock an aqueous solution of alkaline earth metal hydroxide and a salt of an alkaline earth metal the concentration of alkaline earth metal cation in the solution being greater than 10,000 ppm and the pH value of the solution being greater than 10;
b. forcing said solution under pressure out into the reservoir rock formation and away from said well bore;
c. maintaining the pressure to prevent the solution from flowing back into the well bore and to cause the solution to remain within the rock formation for a time period and with a volume which is:
1. insufficient to consolidate sand, but
2. sufficient
i. in respect of expansible clay particles to alter their electrical behavior, thereby causing them, in hydrated form, to occupy a smaller effective volume than prior to the altering, and
ii. in respect of non-expansible clay particles and originally expansible clay particles whose electrical behavior has thus been altered pursuant to (i), chemically to transform them into clay particles which are capable of permanently adhering to rock substrates, thereby to decrease the existing sensitivity of both expansible and non-expansible clay particles to fluids and permanently to change the clay particle structure so as to prevent future sensitivity of fluids
d. thereafter releasing the well head pressure, thereby enabling solution to flow back into the well bore.

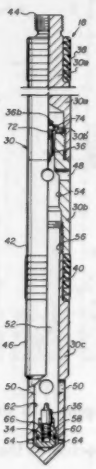
4,031,960
CIRCULATING VALVE

William A. Dudley, Garland, Tex., assignor to Teledyne, Inc., Garland, Tex.

Filed Feb. 25, 1976, Ser. No. 661,249

Int. Cl.² F04F *1/08;* **E21B** *43/12*

U.S. Cl. 166—317 **33 Claims**



1. A circulating valve for use in a well comprising:
valve housing means;
seal means around said valve housing means;
first circulating port means in said valve housing means on one side of said seal means;
second circulating port means in said valve housing means on the other side of said seal means;
passage means in said valve housing means between said first and second circulating port means;
valve plug means movable between an initial position blocking flow through said passage means and a second position permitting flow through said passage means; and
frangible drawbar means to releasably maintain said valve plug means in said initial position.

4,031,961
OIL AND GASOLINE FIRE EXTINGUISHING COMPOSITION

Alfred R. Globus, Bayside, N.Y., assignor to Guardian Chemical Corporation, Hauppauge, N.Y.

Division of Ser. No. 452,603, March 19, 1974, Pat. No. 3,979,302. This application June 30, 1976, Ser. No. 701,295

Int. Cl.² A62C *1/00*

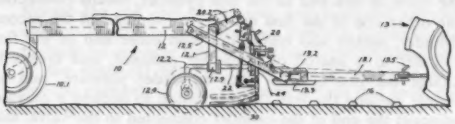
U.S. Cl. 169—47 **3 Claims**

1. A process for extinguishing hydrocarbon fires comprising contacting said fire with a composition comprising a polymerized (hydrated amide-amine) complex formed from at least one fatty acid having 8 to 18 carbon atoms and at least one dialkanol amine having 1 to 6 carbon atoms per alkanol group.

4,031,962
FARM IMPLEMENT POSITIONER

Earl H. Ellinger, Crookston, Minn., assignor to Dee, Inc., Crookston, Minn.

Filed Oct. 14, 1975, Ser. No. 621,804
Int. Cl.² A01D *33/00*
U.S. Cl. 171—8 6 Claims



1. A positioner for maintaining the position of an implement such as a sugar beet harvester in correct alignment with the plants of a crop row, and comprising

a harness pivotable about an upright axis and mountable to an implement;

a pair of spaced, elongated sensing shoes for contacting plants in a plant row therebetween;

linkage means pivotally mounting the shoes at their forward ends to the harness for swinging movement of the shoes with respect to the harness, and including means limiting generally horizontal swinging movement of the shoes with respect to the harness to unison movement of the shoes toward and away from each other;

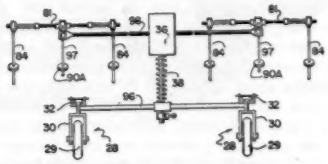
means resiliently urging the shoes to swing toward each other for mutual contact with successive plants of a crop row therebetween, whereby misalignment of the implement with a crop row causes the harness to rotate about its upright axis; and

implement steering means responsive to rotation of the harness about its axis to steer the implement into realignment with the crop row.

4,031,963
DEPTH CONTROL DEVICE FOR GROUND WORKING AGRICULTURAL IMPLEMENTS

Erhard Poggemiller, Box 128, Luseland, Saskatchewan, and Ralph Sweet, Box 3, Forgan, Saskatchewan, both of Canada

Filed Apr. 14, 1975, Ser. No. 567,624
Int. Cl.² A01B *63/114, 63/12, 65/06*
U.S. Cl. 172—4 22 Claims

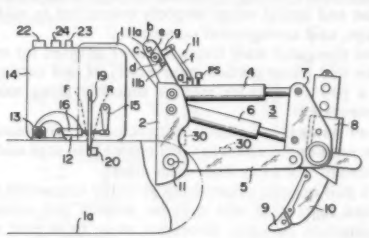


1. A depth control device for earth working agricultural implements such as cultivators, seed drills, discers, underground harvesters and planters and the like which includes supporting framework, ground engaging wheels supporting said framework, earth working components supported from said supporting framework and means to raise and lower and hence adjust the depth of penetration of said earth working components in the ground being worked; said device comprising in combination at least two surface engaging sensing members spaced apart from one another and each operatively secured by one end thereof to said framework and extending in advance of said earth working components, means operatively connected between said surface engaging sensing members to average out the vertical movement required to operate said means to adjust said depth of penetration, said means operatively connected between said surface engaging sensing members including a connecting bar secured by one end thereof to one of said surface engaging sensing members and by the other end thereof to the other of said surface engaging sensing members, and means operatively connected between said connecting bar and said means to adjust the depth of penetration of said earth working components to operate said last mentioned means thereby maintaining said earth working components at a predetermined depth of penetration relative to the surface of the ground.

4,031,964
AUTOMATIC CONTROL SYSTEM CONTROLLING A RIPPER USED ON A CONSTRUCTION EQUIPMENT

Yasuyuki Takahashi, and Tomoharu Sano, both of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Japan

Filed Jan. 29, 1975, Ser. No. 545,318
Claims priority, application Japan, Feb. 1, 1974, 49-12725
Int. Cl.² A01B *63/112*
U.S. Cl. 172—9 6 Claims



1. Automatic control system for a ripper used on a construction equipment comprising:

a ripper mounted on the rear portion of the body of the construction equipment and including a shank, tilt cylinders for tilting the shank, lift cylinders for raising or lowering the shank, links disposed in parallel to the tilt cylinders and a shank holding structure for securely holding the shank;

a load detector mounted on the ripper and capable of detecting overload applied to the shank;

a depth detector for detecting predetermined upper and lower limit positions of the shank; and

a control device actuated by the outputs of the load detector and the depth detector for maintaining penetration depth of the shank at the predetermined lower limit when normal load is applied to the shank and raising the shank when a predetermined overload is applied thereto to reduce the load to a value less than the overload;

whereby penetration depth of the shank is automatically controlled to a value at which no overload is applied to the shank; said control device comprising:

a first relay circuit producing a first control signal when overload is applied to the shank at a shank position which is lower than the upper limit position;

a second relay circuit producing a second control signal when load less than overload is applied to the shank at a shank position which is not the predetermined shank position;

an electromagnetic valve switched to a shank raising position upon receipt of the first control signal, to a shank lowering position upon receipt of the second control signal and to a neutral position when the valve receives neither signal; and

a hydraulic actuation means for actuating the lift cylinders responsive to switching of the electromagnetic valve;

said hydraulic actuation means comprising:

an actuator actuated by the electromagnetic valve;

an operation lever actuated by the rod of the actuator; and

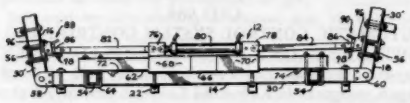
ripper actuation valve interlocked with the operation lever for switching operation and changing direction of fluid from a fluid source to the lift cylinder.

4,031,965

TILLAGE TOOL WING FOLDING KIT

Calvin B. Blair, P.O. Box 97, Barnard, Kans. 67418

Filed Dec. 17, 1975, Ser. No. 641,628
Int. Cl.² A01B *63/00*
U.S. Cl. 172—311 **10 Claims**



1. A wing lifting arrangement having structural characteristics adapting same for use in combination with an earthworking implement having a central carriage with a rigid frame portion and lateral wings hingedly connected to said central carriage, said arrangement comprising:

a. an elongated main frame member adapted for mounting on said frame portion transversely of said carriage;

b. a pair of cylinder mounts slideable along said frame member;

c. an extensible cylinder connected to said mounts and extending therebetween and operable to urge said mounts toward and away from each other;

d. a pair of arms respectively pivotally connected at a first end thereof to said cylinder mounts and extending in generally opposite directions away from said cylinder; and

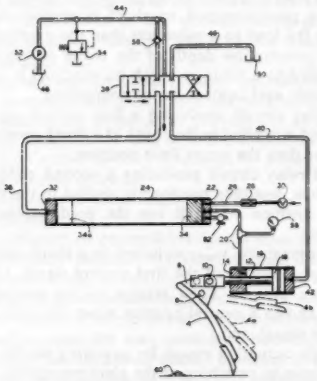
e. a wing connector adapted for mounting on each of said wings, said arms respectively being pivotally connected at a second end thereof to said wing connectors, whereby the contraction of said cylinder produces relative movement of said cylinder mounts toward each other and folding of the wings about said central carriage.

4,031,966

OPERATING AND SHOCK CYLINDER ASSEMBLY FOR VEHICLE UNDERBODY SCRAPERS AND THE LIKE

Eugene A. Farrell, Fishers Landing, N.Y., assignor to Frink Sno-Plows, Clayton, N.Y.

Filed June 21, 1976, Ser. No. 698,037
Int. Cl.² E02F *3/12*
U.S. Cl. 172—794 **9 Claims**



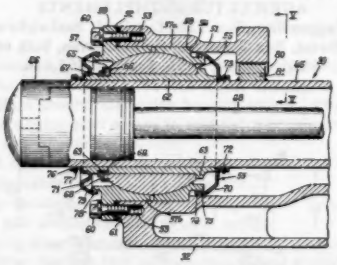
1. An operating and shock cylinder assembly for a vehicle mounted scraper blade that is pivotable between retracted and road engaging positions, a first vehicle mounted cylinder having a free floating piston therein, a second vehicle mounted cylinder having a piston and a rod connected at one end to the piston, the rod passing through an end of the cylinder and being connected at its other end to the pivotable scraper blade, a multi-position control valve, means to deliver hydraulic fluid under pressure to the valve, means connecting the valve to one end of the first cylinder, means connecting the other end of the first cylinder to one end of the second cylinder, means also connecting said other end of the first cylinder to a source of air under pressure, and means to charge the first cylinder with air under pressure, said air charge causing the free floating piston to occupy a position adjacent the end of the cylinder connected to the valve, said air charge also causing the piston in the second cylinder to move to a position whereby the scraper blade is pivoted downwardly into road engaging position, said control valve being movable after the first cylinder has been charged with air to a position whereby hydraulic fluid under pressure is delivered to the first cylinder causing the free floating piston to move toward the end of the cylinder connected to the air source and second cylinder, said piston movement causing the air in the first cylinder to pass into the second cylinder and be further compressed, the compressed air in the second cylinder acting to firmly but yieldably bias the scraper blade into road engaging position.

4,031,967

MOTOR GRADER WITH SPHERICAL BEARING MOUNTING FOR BLADE TILT CYLINDERS

Robert Allan Atherton, Chillicothe, and Carroll Richard Cole, Decatur, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 14, 1976, Ser. No. 696,105
Int. Cl.² E02F *3/76, 3/85*
U.S. Cl. 172—795 **10 Claims**



1. In a motor grader which includes a circle having a pair of integral, depending support arms at its rearward portion, blade carrying means including a pair of bearing housings the lower end portions of which are mounted on transverse pivots in the lower extremities of the support arms so said housings are forward of the arms, a grader blade assembly mounted on said bearing housings, and hydraulic cylinder and piston means mounted on the circle and operatively connected to the bearing housings for tilting the latter about said transverse pivots, an improved cylinder mounting comprising, in combination:

a pair of integral sleeves on the circle which have longitudinal axes aligned with upper portions of the bearing housings;

transverse pivot pins on the bearing housings aligned with said longitudinal axes;

a hydraulic cylinder and piston unit positioned in each of said sleeves and having a piston rod connected to one of said transverse pivot pins;

a bearing collar secured to the cylinder of said unit within

the sleeve, said collar having spaced circumferential flanges;

a spherical bearing removably mounted on said collar between said flanges;

and a socket secured to the interior of the sleeve, said socket mounting the spherical bearing for limited universal movement, said socket having a first annular element toward the rod end of the unit and a second annular element toward the head end, said elements having facing surfaces on opposite sides of the transverse median plane of the spherical bearing, and means maintaining said annular elements in snug engagement with said spherical bearing.

4,031,968

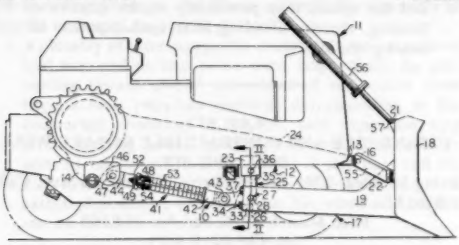
CUSHIONED PUSH DOZER DEVICE

Ronald L. Krolak, Morton, and Duane L. Parker, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 28, 1975, Ser. No. 626,421

Int. Cl.² E02F 3/76

U.S. Cl. 172—801 **7 Claims**



1. A resilient push dozer arrangement for a vehicle having a longitudinally extending mounting frame, comprising;

a push dozer transversely disposed at one end of the vehicle;

an elongated push arm rigidly secured to and extended from such dozer in juxaposition below said mounting frame of the vehicle;

means for swingably attaching the push arm to the mouting frame so that the push arm and hence the push dozer is movable in a rearward direction relative to the mounting frame when an impact load is applied in a rearward direction to the push dozer, said means including a rigid supporting link having an end pivotally attached to the mounting frame and pivotally connected to and swingably supporting the distal end of the push arm; and

means for cushioning the rearward movement of the push dozer and push arm so that shock loads applied to the push dozer are cushioned and transmitted in a rearward direction to the mounting frame at a point relatively widely spaced from said attaching means by the cushioning means independent of the attaching means.

4,031,969

METHOD AND APPARATUS FOR EARTH BORING

Roy H. Cullen, and Jimmie R. Aker, both of Houston, Tex., assignors to Roy H. Cullen

Division of Ser. No. 448,975, March 7, 1974, Pat. No. 3,926,269. This application June 27, 1975, Ser. No. 591,125

Int. Cl.² E21B 3/10

U.S. Cl. 175—65 **8 Claims**

1. A method of deep earth boring in a borehole with a rotating drill bit driven by an electric motor power means and mounted with a drilling string of desired length formed by a plurality of connected tubular pipe joints having communicating bores which enables communication of the drill bit with a supply of drilling fluid, including the steps of:

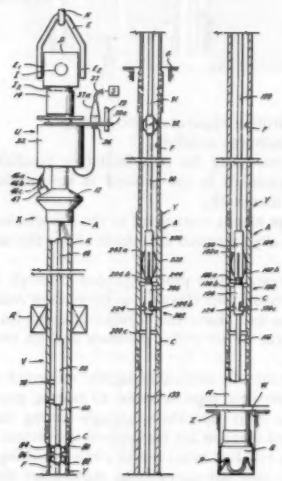
drilling a borehole to a predetermined depth and thereafter removing the drill bit and drill string from the borehole;

assembling a drill bit with an electric motor power means to form a unit to effect earth formation penetrating rotation with the drill bit when the electric motor power means is operated;

lowering the drill bit and electric motor power means therewith in the borehole to the predetermined depth on a drilling string composed of pipe having a bore extending therethrough and a first electrical connector at the lower end thereof;

lowering an electrical power conductor cable means having a length substantially the same as the drilling string in the bore of the drilling string with a second electrical connector at its lower end and connecting the lower end of the second electrical connector with said first electrical connector to establish an electrical connection between said conductor means and said motor power means to supply electrical power to the drill bit and electric motor power means unit;

releasably securing the upper end of the electrical power conductor cable means with the drilling string with a securing means releasable from the drilling string by an upward force applied to the electrical power conductor cable means which effects disconnection of the electrical connectors;



connecting the electrical power conductor cable means with a source of electrical power for supplying electrical power to the drill bit and electric motor power means unit to rotate the drill bit;

supplying electrical power to the drill bit and electric motor power means unit when desired to rotate the drill bit to effect earth formation penetrating rotation of the drill bit wherein earth boring is effected;

flowing drilling fluid through the bore of the drilling string while supplying electrical power to rotate the drill bit;

adding tubular pipe joints to extend the length of the drilling string;

installing additional electrical power conductors in the bore of the added on pipe joints prior to the step of connecting the electrical power conductor means with the source of electrical power;

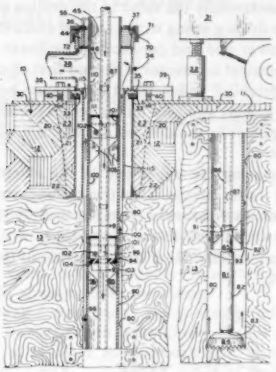
thereafter removing said additional electrical power conductors from the drilling string; and

lowering a fishing tool down into the bore of the drilling string to engage and remove said electrical power conductor cable means from the drilling string by applying the upward force thereto with the wireline fishing tool means for thereafter permitting running a tool through the bore substantially to the bottom of the drilling string.

4,031,970
BOREHOLE DRILLING APPARATUS

Billie E. Belknap, P.O. Box 846, Reedley, Calif. 93654

Filed Feb. 9, 1976, Ser. No. 656,362
Int. Cl.² E21B 1/06, 21/00
U.S. Cl. 175—103 12 Claims



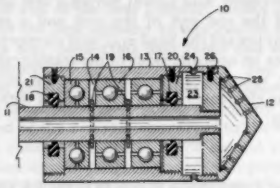
1. A well drilling apparatus comprising:
A. a slip discharge conduit,
B. means mounting the slip discharge conduit in a fixed upright position in the ground in substantially air-tight relation therewith,
C. discharge means connected to the slip discharge conduit and laterally extended therefrom above the surface of the ground,
D. an elongated drill pipe extended through the slip discharge conduit for elevational movement relative thereto having an end above the conduit adapted for connection to a source of air under pressure and an end below the conduit,
E. a pneumatically actuated hammer mounted on the lower end of the drill pipe adapted to release compressed air from the drill pipe therethrough having the drill pipe supported thereon for elevational movement therewith,
F. a debris conduit mounted in circumscribing relation on the drill pipe for elevational movement therewith and defining a passage therebetween having an upper end disposed in the slip discharge conduit and an open lower end adjacent to the hammer to receive air released by the hammer and debris generated thereby, and
g. a sliding seal between the slip discharge conduit and the upper end of the debris conduit to force said air and debris up the passage and out the laterally extended discharge means.

4,031,971
JET NOZZLE DRILLING ASSEMBLY

Thomas R. Miller, Waynesburg, Pa., assignor to Continental Oil Company, Ponca City, Okla.

Filed Oct. 8, 1976, Ser. No. 730,883
Int. Cl.² E21B 1/06
U.S. Cl. 175—107 4 Claims

1. In a drilling assembly comprising
a. a fluid supply shaft;
b. a jet nozzle rotatably mounted on an end of said fluid supply shaft and having a plurality of outlet ports adapted to impart rotational force to said nozzle upon passage of fluid through said ports;
c. a housing affixed to said nozzle and extending rearwardly therefrom to encompass a portion of said fluid supply shaft;
d. a bearing section between said fluid supply shaft and said housing, said bearing section including thrust bearing means and radial bearing means; and
e. retaining means connected to said fluid supply shaft and adapted to retain said nozzle, housing and bearing means in position on said fluid supply shaft;
the improvement comprising:

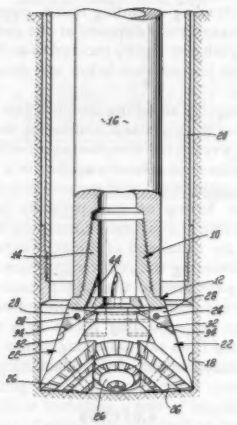


vent means providing an unrestrained fluid passage from the rear of said nozzle to the exterior of said housing whereby pressurized fluid leaking between the fluid supply shaft and the nozzle may pass freely to the exterior of the housing, thereby avoiding fluid contamination of said bearing section.

4,031,972
EXPANDABLE AND CONTRACTIBLE ROTARY WELL DRILLING BIT

Irving X. Burg, 2301 Bayside Drive, Corona del Mar, Calif. 92625

Filed Mar. 8, 1976, Ser. No. 664,960
Int. Cl.² E21B 9/26
U.S. Cl. 175—263 4 Claims



1. In a rotary drill bit which is contractible to fit within a casing to permit withdrawal through the casing, and which is expandable below the casing to drill a well bore of a diameter larger than the outside diameter of the casing so as to permit the casing to follow the bit to prevent collapse of and/or lost circulation from the well bore thereabove, the combination of:
a. a base having an upper end threaded for connection to the lower end of a rotary drill string in the casing for driving the bit;
b. a plurality of cutter arms circumferentially spaced around said base therebelow and respectively having cutters thereon;
c. a plurality of pivot pins respectively pivotally connecting said cutter arms to said base for simple pivotal movement inwardly and outwardly between retracted positions corresponding to the contracted condition of the bit and

extended positions corresponding to the expanded condition of the bit, said pivot pins having circular cross sections and being disposed in holes of circular cross section in said base and said cutter arms, respectively;

d. a plurality of interengageable expansion stop means on said base and on said cutter arms, respectively, for preventing outward pivotal movement of said cutter arms beyond their extended positions corresponding to the expanded condition of the bit and for transferring the weight of said base and the drill string to said cutter arms without applying any substantial loads to said pivot pins, each of said interengageable expansion stop means including a first set of interengageable expansion stops on said base and the corresponding cutter arm adjacent one end of the corresponding pivot pin and below and radially outwardly of the corresponding pivot pin, a second set of interengagable expansion stops on said base and the corresponding cutter arm adjacent the other end of the corresponding pivot pin and below and radially outwardly of the corresponding pivot pin, and a third set of interengageable expansion stops on said base and the corresponding cutter arm intermediate the ends of the corresponding pivot pin and above and radially outwardly of the corresponding pivot pin; and

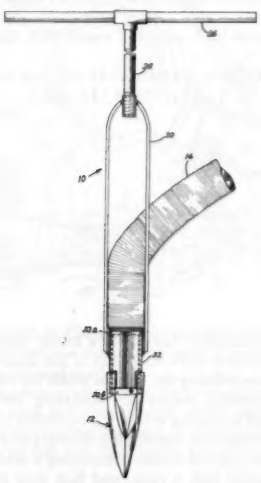
e. a plurality of interengageable contraction stop means on said base and on said cutter arms, respectively, for preventing inward pivotal movement of said cutter arms beyond their retracted positions corresponding to the contracted condition of the bit, said expansion stop means limiting inward pivotal movement of said cutter arms to values such that the weight of said base and the drill string pivots said cutter arms outwardly into their extended positions, to expand the bit, when said cutters rest on the bottom of said well bore.

4,031,973

PLACER MINING TOOL

Robert G. Claye, 420 South St., Yreka, Calif. 96097, and David S. Wilson, P.O. Box 12, Klamath River, Calif. 96050

Filed Nov. 10, 1975, Ser. No. 630,530
Int. Cl.² E21B 49/00
U.S. Cl. 175—320 **2 Claims**



1. A manually operable ore digging instrumentality for use in placer mining including, in combination,

a. a bit carrying sleeve of substantial diameter,

b. manually operable means for turning the sleeve back and forth and for thrusting it downward continuously or intermittently as required, and

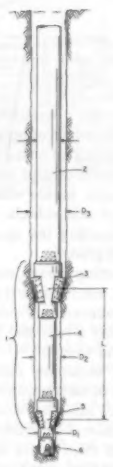
c. bit forming means fixedly attached to said sleeve consisting of three like arcuate earth-boring segments, the segments being generally rectangular in shape but each tapered at a small acute angle along its lower end, and being twisted to bring the beveled edges at their lower ends to a common axis along which they are united to one another, but being spaced from one another at their widest portions by substantially more than their own individual widths, the construction and arrangement being such that material dislodged in pieces or chunks by manual reciprocation of the bit whose maximum dimensions do not exceed the maximum width of a bit segment can be accepted between the bit segments and pass unobstructedly through the sleeve.

4,031,974

BORING APPARATUS CAPABLE OF BORING STRAIGHT HOLES

Carl R. Peterson, Boxford, Mass., assignor to Rapidex, Inc., Gloucester, Mass.

Filed May 27, 1975, Ser. No. 581,379
Int. Cl.² E21B 9/24
U.S. Cl. 175—334 **7 Claims**



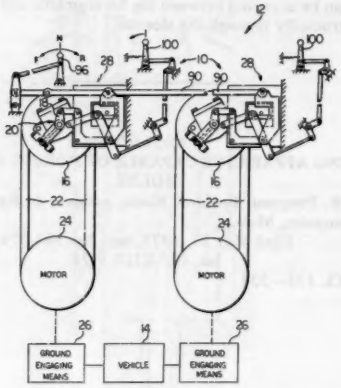
1. A rock boring assembly for producing a straight hole for use in a drill string above a pilot boring bit of predetermined diameter smaller than the desired final hole size, said boring assembly comprising a small conical boring bit and a larger conical boring bit, said conical boring bits mounted of lower and upper ends of an elongated spacer, respectively, the major effective cutting diameter of each of said conical boring bits being at least 10% greater than the minor effective cutting diameter of the respective bit, said spacer having a cross-section resistant to bending under the expected cutting forces, said spacer being rigidly connected to said conical bits to rotate therewith while spacing said conical boring bits apart a distance at least five times the major cutting diameter of said small conical boring bit, thereby spacing the pivot provided by said two conical boring bits to limit bodily angular deflection of said assembly and providing a substantial moment arm to resist lateral forces applied to said assembly by said pilot bit and drill string, and said spacer spacing said conical bits a distance than about 20 times the major cutting diameter of said lower conical boring bit to enable said spacer to act as a bend-resistant beam to resist angular deflection of the axis of either of said conical boring bits relative to the other when it receives uneven lateral force due to non-uniformity of cutting conditions about the circumference of said bit, said spacer spacing said conical bits apart by from 4 to 16 feet.

4,031,975

MECHANICAL MULTIPLIER FOR THE PURPOSE OF SPEED AND STEERING CONTROL FOR HYDROSTATIC SYSTEM

William K. Engel, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 21, 1976, Ser. No. 650,832
Int. Cl.² B62D 11/04
U.S. Cl. 180—6.48 7 Claims



1. In a control system for a hydrostatic drive of a vehicle comprising a pair of hydrostatic pumps the output of each of which is adjustable by moving an arm attached to a servo valve controlling the displacement of said pumps, each pump powering a respective hydraulic motor which drives a respective ground engaging means of said vehicle, an improved mechanical arrangment for controlling the speed and steering functions of said system, comprising:

A. a pair of pump adjusting means, one communicating with each of said pumps, each adjusting means comprising:

1. a first crank mounted centrally thereof to a frame adjacent said pump, a first end of said first crank drivingly linked to said arm;

2. a second crank mounted centrally thereof to said frame, a first end of said second crank drivingly linked to a second end of said first crank; and

3. a third crank mounted centrally thereof to said frame, a first end of said third crank drivingly linked to said second end of said first crank and a second end of said third rank drivingly linked to independent steering linkage means;

B. a pair of independent operator adjustable steering means, each respective one of said pair of steering means operatively connected to move a respective one of said pair of independent steering linkage means; and

C. tying means drivingly mounted adjacent a second end of each of said second cranks linking their movement.

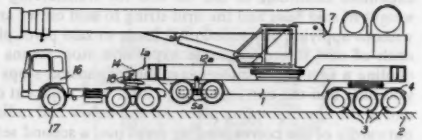
4,031,976

CONSTRUCTION VEHICLE HAVING RETRACTABLE WHEELS FOR TOWING

Bernard Lucien Lambert, Montceau-les-Mines, France, assignor to Potain Poclain Materiel (P.P.M.), Montceau-les-Mines, France

Filed Oct. 7, 1975, Ser. No. 620,466
Claims priority, application France, Oct. 9, 1974, 74.33991
Int. Cl.² B62D 61/12, 53/00
U.S. Cl. 180—14 R 4 Claims

1. A self-propelling construction machine comprising a frame provided with at least two groups of ground engaging members disposed and spaced longitudinally on said frame, one end of the frame being provided with a means for coupling to a towing vehicle, wherein the first group of ground engaging members is disposed near said end provided with the coupling means, said first group comprising means for elevating the ground engaging members with respect to the frame to a position above the ground, and the second group of displacement members being at a constant height relative to the frame and enabling movement of the machine when it is coupled to the towing vehicle, a prime mover on said machine, said first



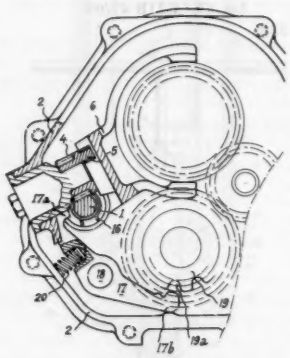
group of ground engaging members comprising drive members, means for transmitting power from said prime mover to said drive members, and said second group of members being mounted for steering movement, whereby said machine may be self-propelled and steered at a construction site, and whereby the machine may be coupled to a towing vehicle and transported over highways with the first group retracted.

4,031,977

TRANSMISSION DEVICES FOR MOTOR VEHICLES

Albert Grosseau, Chaville, France, assignor to Societe Anonyme Automobiles Citroen, France

Filed Jan. 8, 1976, Ser. No. 647,605
Claims priority, application France, Jan. 14, 1975, 75.00999
Int. Cl.² B60T 1/06
U.S. Cl. 180—77 R 13 Claims

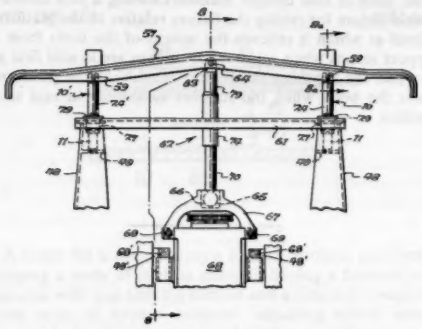


1. In a transmission device for a motor vehicle, means for providing a reverse drive condition of the transmission device, means for immobilizing the vehicle when the vehicle is stationary, first actuating means for actuating the reverse drive means, second actuating means for actuating the immobilizing means, and means for controlling the first and second actuating means, the control means comprising a manually actuated, slidable, selector rod, a rack, and first stop means, the rack and first stop means being movable with the selector rod, the first actuating means comprising a pinion arranged to engage the rack, and the second actuating means comprising a cam and second stop means connected to the cam, the cam being movable in at least one direction by the rod during a part of its displacement, by cooperation between the first and second stop means.

4,031,978
ENERGY ABSORBER UNIT AND ENERGY MANAGEMENT SYSTEM

Paul H. Taylor, Grand Island, N.Y., assignor to Tayco Developments, Inc., North Tonawanda, N.Y.

Filed May 28, 1975, Ser. No. 581,544
Int. Cl.² B60N 2/00
U.S. Cl. 180—91 15 Claims

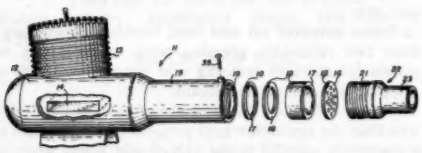


1. An energy management system for a vehicle having a frame, an engine movably mounted on said frame, and a bumper comprising impact energy absorbing unit means having first and second end portions, first means coupling said first end portion of said energy absorbing unit means to said bumper and second means coupling said second end portion of said energy absorbing unit means to said engine to cause impacts received by said bumper to be transmitted to said first end portion of said energy absorbing unit means while the forward momentum of said engine moving forwardly relative to said frame is transmitted to said second end portion of said energy absorbing unit means.

4,031,979
ADJUSTABLE MUFFLER FOR MODEL AIRCRAFT TYPE ENGINES

Roger W. Raleigh, 530 Alsace Lorraine, Half Moon Bay, Calif. 94019

Filed Apr. 24, 1975, Ser. No. 571,374
Int. Cl.² F01N 1/00
U.S. Cl. 181—69 10 Claims



1. In a muffler for muffling the exhaust of a two-cycle combustion engine of the type commonly used to power miniature aircraft, cars, boats and models:

baffle chamber means adapted to be connected in gas communication with and downstream of the exhaust port of the combustion engine for flow therethrough of the exhaust gases as fed into said baffle chamber means from the engine;

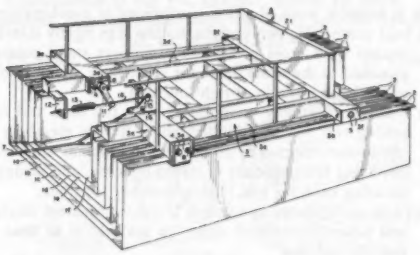
a plurality of baffle means adapted to be disposed in said baffle chamber means in spaced apart relation in the direction of the exhaust gas flow therethrough for providing different sonic wave reflections from each of said baffle means for reflecting sonic waves in the exhaust stream back to the engine for muffling the flow of the exhaust flow therethrough; and

nozzle means having lesser cross-sectional dimensions for the flow of exhaust gas therethrough than those of said baffle chamber means so as to produce a sonic wave reflection in said baffle chamber and adapted to be connected in exhaust gas communication with and downstream of said baffle chamber means for reflecting sonic wave energy without substantially restricting the flow of exhaust gas therethrough for further muffling the flow of exhaust gas.

4,031,980
BRAKING DEVICE FOR LADDER LIFTER

Fusaji Terayama, Osaka, and Tetsuo Kozai, Higashiosaku, both of Japan, assignors to Morita Pump Kabushiki Kaisha, Osaka, Japan

Filed Aug. 14, 1975, Ser. No. 604,761
Int. Cl.² E06C 7/12
U.S. Cl. 182—103 3 Claims

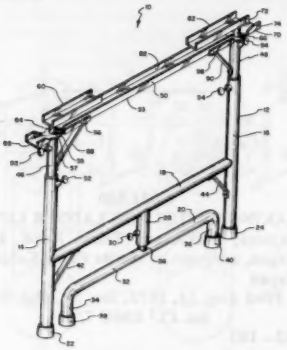


1. In an aerial ladder assembly having at least one pair of laterally spaced, channel-shaped ladder rails forming a ladder unit, a ladder lifter unit having laterally spaced rotatable wheels mounted thereon for rotational movement along each of said pairs of ladder rails of said ladder unit, rope means associated with said ladder lifter unit to raise or lower said lifter unit along the ladder rails of said ladder unit, the improvement of a braking device for stopping the movement of the ladder lifter unit along the ladder unit upon the breaking of the rope means, said braking device comprising elongated plate element means having a serrated upper surface fixed to the upper surface of each ladder rail of the ladder unit along the longitudinal length of each rail, brake cam element means having a bottom serrated surface pivotally mounted adjacent its upper end to said ladder lifter unit above each of said ladder rails, longitudinally tensionable spring means operatively connected intermediate the respective ends thereof to each brake cam element means, lever means pivotally mounted to said ladder lifter unit and connected at one end to one end of said spring means and at the other end to the rope means, bracket means mounted on said lifter means in longitudinally spaced relationship to said lever means and connected to the other end of said spring means whereby when said rope means are under tension, said spring means will be likewise under tension to maintain the brake cam element means in a raised state away from the serrated plate element means on said ladder rails but upon loss of tension in the rope means, the lever means will be pivoted forwardly causing the spring means to effect the pivoting of the brake cam element means towards the ladder rails to cause a meshing of the serrated surface of the cam element means against the serrated surface of each plate element means of each ladder rail to stop the movement of the ladder lifter unit along the ladder unit.

4,031,981
FOLDABLE WORK PLATFORM

Edward Spencer, La Grange, Ill., assignor to Little Giant Industries Inc., American Fork, Utah

Filed June 1, 1976, Ser. No. 691,926
Int. Cl.² E04G *1/32*
U.S. Cl. 182—153 6 Claims

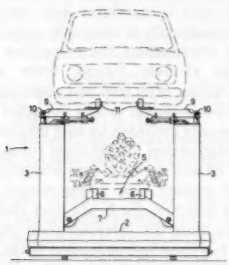


1. A foldable work platform comprising in combination:
a base comprising two upright, hollow legs rigidly interconnected by a cross piece and a support stand rotatably attached to the cross piece for selectively giving stability to the base when in upright position;
a scaffold adjustably cooperating with the base and comprising two downwardly depending hollow members rigidly interconnected by an open cross channel, each member being telescopically received by a leg, and means for securing each leg and hollow member together;
an arm configurated as an open U-shaped channel rotatably and extensibly carried upon the scaffold at at least one end thereof; and
wooden inserts nested within the cross channel and arms, the inserts extending above the sides of the channels.

4,031,982
DEVICE FOR MOUNTING CHASSIS DETAILS ONTO AN AUTOMOBILE BODY

Olov Halvar Lindfors, Goteborg, Sweden, assignor to AB Volvo Penta, Goteborg, Sweden

Filed Mar. 20, 1975, Ser. No. 560,556
Claims priority, application Sweden, Mar. 22, 1974, 7403918
Int. Cl.² B60S *13/00*
U.S. Cl. 187—8.59 2 Claims

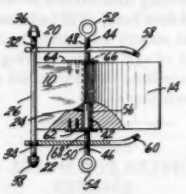


1. Device for mounting chassis details onto an automobile body, said device comprising an elongated rectangular platform, wheels supporting said platform, upright members mounted upon opposite ends of said platform at the corners of said platform, support means for an automobile body mounted on the upper part of each of said upright members, for movement between a first position under the body and a second position at the side of the body, said support means comprising support arms, said mounting means for said support means comprising vertical axles on which said arms are mounted for horizontal swinging movement between said first and second positions, a fixture for chassis details supported by the platform, each of said upright members having a jack connected to said fixture for raising the fixture relative to the platform to a level at which it relieves the weight of the body from said support means when said support means are in said first position and for lowering the fixture relative to the platform to lower the body when the support means are in said second position.

4,031,983
TIRE CHOCK

Peter S. Lentini, 623 Spruce St., Kulpmont, Pa. 17834

Continuation of Ser. No. 552,856, Feb. 25, 1975, abandoned. This application June 14, 1976, Ser. No. 695,387
Int. Cl.² B60T *3/00*
U.S. Cl. 188—32 11 Claims



1. A wheel chock for preventing inadvertent movement of a wheel rotatably mounted on an axis comprising:
a. a base member having a wheel-engaging element for engaging the circumferential periphery of said wheel and being of sufficient height to prevent wheel rotation about said axis;
b. a frame mounted on said base member comprising at least two releasable gripping arms, an adjusting rod, means for movably securing said arms to said rod; and gripping arms anchoring means;
said adjusting rod being disposed at a greater distance from said axis than the circumferential periphery of said wheel and being essentially parallel to the axis of said wheel when said wheel engaging element is abutting the outer circumference of said wheel; each of said gripping arms having a proximal end and a distal end; said gripping arms extending radially inwardly of the circumferential periphery of said wheel in unsupported and unconnected embrace of said wheel at opposite sides thereof when said wheel-engaging element is abutting the outer circumference of said wheel; said distal ends extending beyond said wheel-engaging element toward the axis of said wheel when said wheel-engaging element is abutting the outer circumference of said wheel; said rod in cooperation with said securing means being adapted to alter the separation between said distal ends of said arms for the purposes of engaging and disengaging said wheel; and said proximal ends of said gripping arms being axially movable with respect to each other whereby the separation between said proximal ends is variable to permit adjustment of said frame to accommodate different sizes of tire.

4,031,984
BRAKE ACTUATOR AND THRUST RECEIVING STRUCTURE

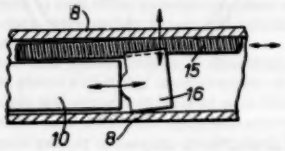
Anthony William Harrison, Birmingham, England, assignor to Girling Limited, Birmingham, England

Filed June 8, 1976, Ser. No. 693,800

Claims priority, application United Kingdom, June 9, 1975, 24697/75

Int. Cl.² B61H *15/00*

U.S. Cl. 188—59 **6 Claims**



1. A brake for a rotor having a braking surface, said brake comprising a body of friction material having a forward end engageable with said braking surface and a rear end; a support for said body of friction material; adjusting means which moves said body of friction material relative to said support to compensate for wear of the friction material, said adjusting means comprising a screw member extending substantially parallel with the direction of movement of said body of friction material, and a thrust member in screw threaded engagement with said screw member and engaging said body of friction material to transmit braking forces from said screw member to said body of friction material; and means for applying braking forces to said screw member; wherein said thrust member can rock into force-transmitting engagement with said support under the action of the braking and reaction forces, the rotation of said thrust member urging said screw member into engagement with said support, whereby said thrust member and screw member are clamped together in said support and reaction forces are transmitted transversely of said screw member and said thrust member to said support in the region of the engagement between said thrust member and said screw member.

4,031,985
MECHANICAL DISC BRAKE

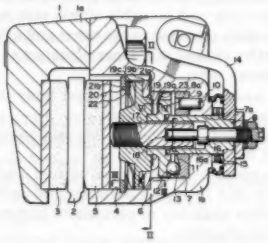
Hiroshi Ito, Kawasaki, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Oct. 12, 1976, Ser. No. 731,202

Claims priority, application Japan, Oct. 20, 1975, 50-126149

Int. Cl.² F16D *65/56*

U.S. Cl. 188—71.9 **3 Claims**



1. A mechanical disc brake comprising an input shaft axially displaceable upon receipt of a rotational movement input, a bolt connected at one end to said input shaft for receiving only said rotational movement of the shaft and abutting at the other end against a friction pad, a nut threaded on said bolt for normally receiving said axial displacement of the input shaft and also for receiving said rotational movement of the input shaft when subjected to clamping force, waved washers disposed on the opposite sides of a radial and outward extension of said nut to normally bias the nut against said input shaft, and a ratchet mechanism disposed between said input shaft and nut to transmit said rotational movement of the input shaft to said nut so as to displace the bolt toward said friction pad in accordance with the rotational amount of the input shaft, characterized in that at least one side of said radial and outward extension of the nut is formed with at least one recess for receiving the projection of one of said waved washers whereby inadvertent rotation of the nut is prevented.

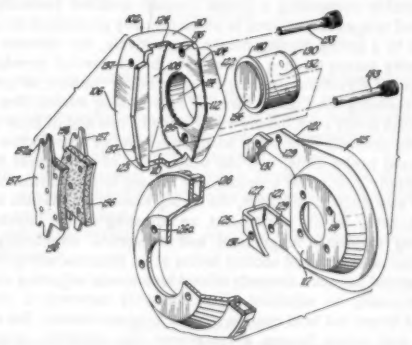
4,031,986
DISK BRAKE CONSTRUCTION HAVING STAMPED SUPPORT

Tom H. Thompson, 540 Grander View Road, Milford, Mich. 48042

Continuation of Ser. No. 454,357, March 25, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,583

Int. Cl.² F16D *55/22*

U.S. Cl. 188—72.4 **15 Claims**



1. Disc brake apparatus comprising: an actuator support including an integral body of stamped sheet metal of uniform thickness having a pair of spaced, substantially flat side walls, a top portion extending between the top edges of said side walls, a pair of end portions each extending between the end edges of said spaced pair of side walls at opposite ends of said top portion such that said top portion extends between the upper ends of said end portions, a stiffening flange projecting outwardly from the lower edge of at least one of said side walls, an actuator opening formed in at least one of said side walls, an integral flange struck from said one side wall and projecting from the periphery of and surrounding said opening to define an integral sleeve having an outwadly projecting cylindrical wall for axially receiving a disc brak actuator assembly, a disc brake actuator module received in said actuator opening and sleeve and supported by the cylindrical wall of said sleeve, said module comprising a cylindrical housing having a closed end and an open end with an actuator mounted therein and axially extendable and retractable with respect to said housing in response to fluid pressure changes in said housing, said housing being received in said sleeve with a friction fit and being formed with a retaining flange projecting outwardly from one end of said housing and engaging said side wall to prevent axial movement of said housing in one direction with respect to said side wall.

4,031,987

SPRING APPLIED, ELECTRICALLY RELEASED BRAKE WITH ADJUSTABLE THRUST ELEMENT

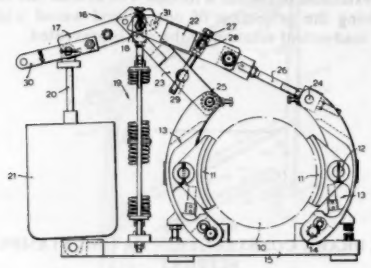
David John Webb, Bridgwater, England, assignor to Elliston, Evans and Jackson Limited, Bridgwater, England

Filed Oct. 24, 1975, Ser. No. 625,303

Claims priority, application United Kingdom, Oct. 26, 1974, 46422/74

Int. Cl.² B60T 13/04

U.S. Cl. 188—75 1 Claim



1. An electrically controlled brake comprising a fixed support, two brake arms each having upper and lower ends and each carrying a respective brake shoe, the lower ends of said brake arms being pivoted to the support, a brake control assembly comprising a brake control member pivotally secured at spaced positions to an electrically controlled thrustor and to a spring biasing means respectively, the thrustor and biasing means tending to move the brake control member in opposed directions and the thrustor being capable, in use, of overcoming the biasing force of said biasing means, first and second levers each having a pair of ends, one end of each lever being pivotally connected to an upper end of a respective one of said brake arms, and the other ends of said levers being pivotally connected together and to said brake control member at a single pivot point, the spring biasing means also being connected to said pivot point, an adjusting device capable of being steplessly lengthened and shortened connecting together said first and second levers at an intermediate position disposed between the ends of said levers, said adjusting device comprising an adjusting screw rotatably mounted in one of said levers but held captive against axial movement, the other of said levers having a transverse pin rotatably mounted therein, and the adjusting screw having screw-threaded engagement within said pin and transversely thereof, whereby rotation of the adjusting screw to adjust the length of the adjusting device varies the angle between said first and second levers only, without varying the length of the levers.

4,031,988

STALL CONTROL AND WEAR BLOCK FOR RECREATIONAL SKATE BOARDS

David John Hill, 1/71 Evans St., Harbord N.S.W. 2096, Australia

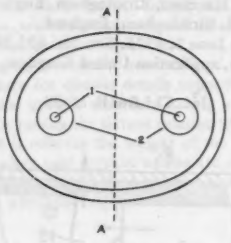
Filed Apr. 28, 1976, Ser. No. 681,056

Claims priority, application Australia, Jan. 7, 1976, 4468/76

Int. Cl.² A63C 17/00

U.S. Cl. 188—250 B 3 Claims

1. A stall control and wear block for skateboards including a platform, comprising a plate-like element formed from moldable material having a plan configuration with major opposing elliptical sides symmetric about a transverse axis, the opposing major elliptical sides containing a central sector of 160° which constitutes a wear edge of which the central 120° is a control edge, no part of the wear and control edges having a radius of less than 15 millimeters or more than 110 millimeters, and at least two countersunk holes formed on the transverse axis of said block adapted to receive connectors for the attachment of the block to the skateboard platform.



4,031,989

DOUBLE EFFECT HYDRAULIC SHOCK ABSORBER

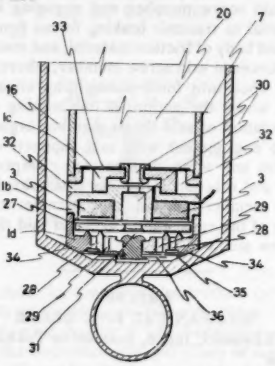
Antonio Giner Blazquez, Lepanto 194 5°-1ª, Barcelona 13, Spain

Filed Feb. 3, 1976, Ser. No. 654,872

Claims priority, application Spain, Feb. 22, 1975, 435006; Dec. 18, 1975, 443663

Int. Cl.² F16F 9/46

U.S. Cl. 188—299 4 Claims



1. A double effect shock absorber comprising:

an inner tube defining an inner chamber having fluid therein;

an outer tube concentric with said inner tube and defining therewith an annular outer chamber;

a piston attached to a rod which extends through one end of said inner tube and movable within said inner chamber;

a body assembly attached to the other end of said inner tube and thereby closing said inner chamber at said other end of said inner tube;

said body assembly including a first body member having therein an annular chamber;

an electromagnet positioned within said annular chamber of said first body member;

said body assembly including a second body member attached to said first body member and defining therewith a collection chamber in permanent communication with said inner chamber;

first and second exhaust duct means extending through said second body member and connecting said outer annular chamber with said collection chamber;

first closure valve means for closing said first exhaust duct means;

second closure valve means for closing said second exhaust duct means, said second closure valve means having a

stronger resistance to opening than said first closure valve means; and

blocking means positioned within said collection chamber, for blocking said first exhaust duct means when said electromagnet is deactivated, and for opening said first exhaust duct means when said electromagnet is activated;

whereby, when said electromagnet is activated, movement of said piston within said inner chamber toward said body assembly will cause said fluid to pass through said first exhaust duct means and open said first closure valve means to pass to said outer annular chamber, while said second closure valve means closes said second exhaust duct means;

whereby, when said electromagnet is deactivated, movement of said piston within said inner chamber toward said body assembly will cause said fluid to pass through said second exhaust duct means and open said second closure valve means to pass to said outer annular chamber, while said first exhaust duct means remain closed by said blocking means.

4,031,990

SET OF CURRENT COLLECTING ELEMENTS USED FOR A CURRENT COLLECTING ROLLER

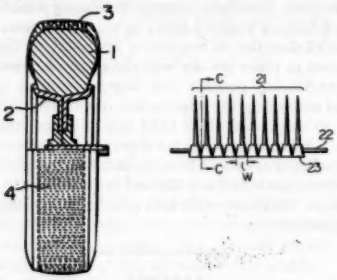
Kazumi Matsui, Tokyo; Takashi Umemori, Musashino; Yutaka Shibata, Takaishi; Kinzo Yamamura, Fujiidera; Tamisuke Kimura, Kobe, and Tomokazu Kashiwara, Nishinomiya, all of Japan, assignors to Japanese National Railways, Tokyo; Sumitomo Electric Industries, Ltd., Osaka and Sumitomo Rubber Industry, Ltd., Kobe, all of, Japan

Filed Nov. 14, 1975, Ser. No. 632,164

Claims priority, application Japan, Nov. 26, 1974, 49-136472

Int. Cl.² B60L *5/04*

U.S. Cl. 191—63 **9 Claims**



1. A current collecting apparatus for use in a current collecting member operatively connected to a current collecting roller, said current collecting apparatus comprising:

a plurality of juxtaposed electroconductive elements having truncated lower portions with at least one hole therethrough; and

a lead wire fitted through and secured to said holes in said plurality of electroconductive elements.

4,031,991

COIN OPERATED ELECTRONIC PARKING METER

Steve Malott, Schaumburg, Ill., assignor to Qonaar Corporation, Elk Grove Village, Ill.

Filed Dec. 29, 1975, Ser. No. 644,598

Int. Cl.² G06F *9/00*

U.S. Cl. 194—1 R **17 Claims**

1. A token actuated timing device comprising:

a. means for storing preprogrammed numerical values at a plurality of addressable memory locations;

b. means for detecting the type and number of each type of token inserted into said device and for addressing a selected memory location each time a token is inserted, said location corresponding to the type and number of token of that type inserted;

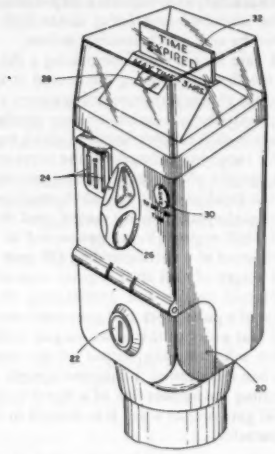
c. first counter means for down counting from any present number to zero at a rate determined by an applied clock frequency and producing a zero detect signal on reaching zero;

d. means for presetting said first counter means to the value stored at said selected memory location;

e. second counter means for selectively counting up or down at a rate determined by an applied clock frequency;

f. means for producing first and second clock frequencies;

g. control means operative each time a token is detected for



i. applying said first clock frequency to said first counter means to down count said first counter means to zero,

ii. simultaneously up counting said second counter means at said first clock frequency until said zero detect signal is produced by said first counter means,

iii. down counting said second counter means at said second clock frequency after said zero detect signal is produced, and

h. means for displaying the count on said second counter means.

4,031,992

PRINTING DEVICE

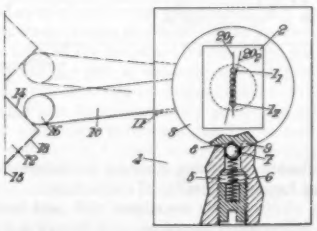
Roger Murat, and Guy Glay, both of Argenteuil, France, assignors to Societe d'Applications Generales d'Electricite et de Mecanique S A G E M, Paris, France

Filed Nov. 11, 1975, Ser. No. 630,923

Claims priority, application France, Nov. 14, 1974, 74.37624

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R **4 Claims**



1. A device for printing data comprising:

at least one printing member of the needle impact type and including a printing head movable in a predetermined direction so as to inscribe the data in lines on a substrate;

a plurality of needles carried by said head for selectively

projecting against said substrate at one end, so as to inscribe characters on a predetermined point grid;

synchronizing means for generating pulses in synchronism with the movement of said printing head in said predetermined direction, each of said pulses corresponding to a column of said point grid;

upright character generator means connected to said synchronizing means and producing at an output for each needle, a sequence of pulses for causing projections of said needle against the substrate in order to inscribe a given upright character, said sequence depending on the character to be inscribed and being controlled by the pulses generated by said synchronizing means;

a plurality of OR gate means each comprising a first and a second input, the first input being connected at the output of said upright character generator means;

for each needle, with the exception of one needle in an extreme position, a shift register having a clock input and a serial input for receiving pulses from the corresponding output of said upright character generator means and a serial output, the clock input of said shift register receiving pulses from said synchronizing means, and the serial output of each shift register being connected to the respective second input of a corresponding OR gate means, the number of stages of said shift register depending on the position of said needle and determining the delay between receipt of a pulse from said generator means and appearance of that pulse at the serial output; and

control means for inhibiting the output of the respective shift register when it is desired to inscribe upright characters and preventing the application of a signal to said first input of the OR gate means when it is desired to inscribe an inclined character.

4,031,993

ELECTRONIC EMBOSSING MACHINE

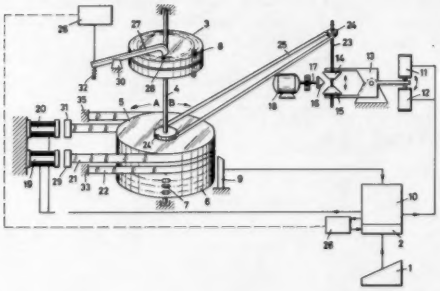
Rainer Eberhard Gürgens, and Helmut August Michael Schottle, both of Berlin, Germany, assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Sept. 25, 1975, Ser. No. 616,639

Claims priority, application Germany, Oct. 1, 1974, 2446890

Int. Cl.² B41J *1/30*

U.S. Cl. 197—6.6 **3 Claims**



1. An electronic embossing machine comprising:

a keyboard having a plurality of characters,

a memory electronically associated with said keyboard to receive information therefrom and operative for storing such information,

a logic controller associated with said memory for receiving information therefrom, said memory being operative to inform said logic controller as to the character selected by said keyboard,

a drum supported upon a rotatable shaft for rotation therewith, said drum having a plurality of numerically arranged code addresses about the perimeter thereof,

a scanner adjacent to said drum for reading said code addresses as they are conveyed thereacross, sid scanner being operatively connected with said logic controller for supplying information thereto and informing said logic controller as to the code address being read,

a die head bearing a plurality of dies thereon and an opening intermediate adjacent dies, said die head being supported by said shaft for rotation therewith, said dies on said die head having characters thereon corresponding to the characters on said keyboard and to the code addresses on said drum, wherein the embossing position is defined as the posture of the die head when the code address corresponding to the die having the character selected by the keyboard is adjacent said scanner,

brake means associated with said logic controller and operative to brake said shaft upon receipt of a brake signal from said logic controller, said brake means including a pair of brake straps disposed about said drum and a movable pawl disposed adjacent said die head,

electromagnetic means connected to said one end of each brake strap and operative to extend its respective brake strap to engage said drum upon receipt of said brake signal and means for moving said pawl into an opening within said die head upon receipt of said brake signal,

a pair of opposed electromagnets each operatively connected with said logic controller to be alternately energized thereby,

drive means operatively connected to said shaft for rotation thereof in an "A" direction upon one of said electromagnets being energized and in a "B" direction upon the other of said electromagnets being energized, said logic controller upon receiving information from said memory indicating the selected character to be embossed and information from said scanner indicating which die is in the embossing position being operative to determine the required direction of rotation of said shaft for the shortest distance to place the die with the selected character into the embossing position and being operative to send a signal energizing the appropriate one of said electromagnets to drive said shaft until said selected character is placed in the embossing position, at which time said logic controller is operative to terminate the energizing of said electromagnets and actuate said brake means to hold said die head stationary with said selected die in the embossing position.

4,031,994

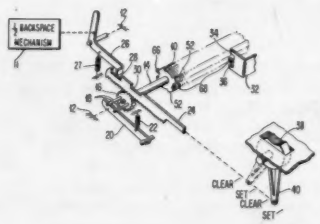
DOUBLE TAB RACK FOR A TYPEWRITER

John O'Neil Schaefer, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,256

Int. Cl.² B41J *21/04*

U.S. Cl. 197—70 **8 Claims**



1. A tab rack assembly comprising a tab rack member and a plurality of tab stop members, each tab stop member representing an incremental escapement position of a printing mechanism relative to a record sheet, said tab rack member

being movable to present alternatively one side thereof or the opposite side thereof to a tabulator control mechanism;

said tab stop members each having two active control projections extending therefrom for engagement by said tabulator control mechanism;

said control projections being opposite each other with respect to the axis of said tab rack member;

said tab stop member being configured to provide means for retention of each of said control projections in each of two positions respectively;

whereby two discreet and independent sets of tab commands may be set into and retained simultaneously in a tab rack member.

4,031,995

KEYBOARD ACTUATED PAPER INSERTION AND EJECTION MECHANISM

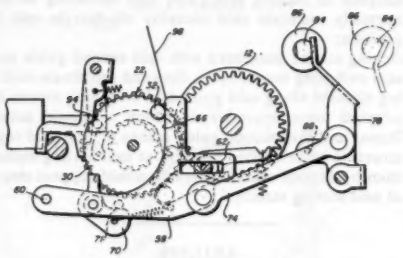
Rudolf Blum, Nurnberg, and Bernd Stiller, Berlin, both of Germany, assignors to Triumph Werke Nurnberg A.G., Nurnberg, Germany

Filed Mar. 17, 1976, Ser. No. 667,554

Claims priority, application Germany, June 13, 1975, 2526445

Int. Cl.² B41J *13/20*

U.S. Cl. 197—138 A **4 Claims**



1. In a typewriter having a rotatable platen and an associated paper hold down bail pivotally mounted for movement between a closed position in rolling contact with said platen and to an open position spaced from said platen,

energizable motor means connected to rotatably index said platen to control movement of a sheet of paper,

a first clutch part rotatably driven by said platen,

a second rotatable clutch part selectively engageable with and driven by said first clutch part and having a camming pin,

a solenoid,

means for coupling over a platen revolution said first and second clutch parts upon energization of said solenoid,

a control lever connected to said paper bail and positioned to be driven by said camming pin to pivot said paper bail to open and closed positions in each clutch cycle, and

operator controlled means for energizing said motor means and for energizing said solenoid.

4,031,996

TAB REPOSITIONING SYSTEM

Dennis Gene Busch, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,732

Int. Cl.² B41J *25/18*

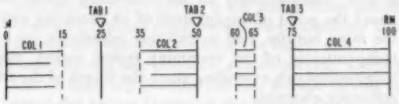
U.S. Cl. 197—176 **10 Claims**

1. A tab repositioning system comprising:

a. storage means having a number of storage locations for storing tabs set along a text line;

b. means for addressing one of said storage locations in said storage means; and

c. means upon addressing one of said storage locations for



causing set tabs following said addressed location to be repositioned in said storage means.

4,031,997

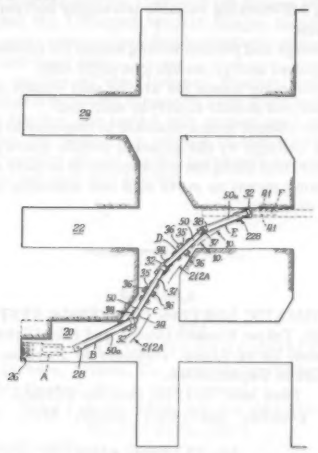
MOBILE TELESCOPICAL ARTICULATED CASCADE CONVEYOR SYSTEM FOR MINING AND AUTOMATIC SELF-TRAMMING WHEEL-MOUNTED CONVEYOR UNIT THEREFOR

Robert C. Nelson, Bluefield, W. Va., assignor to New River Manufacturing Company, Inc., Glen Lyn, Va.

Filed Dec. 5, 1975, Ser. No. 637,977

Int. Cl.² B65G *21/14*

U.S. Cl. 198—301 **10 Claims**



1. In a mobile conveyor system for mining having a series of elongated mobile conveyor units articulately interconnected in cascade relationship with each of said units positioned to discharge onto a succeeding unit for conveying material from a movable source to a remote stationary floor conveyor, each mobile conveyor unit having a conveyor frame with an endless conveyor element trained for orbital movement between pulleys at opposite ends and driving means for said conveyor element, at least one of said mobile conveyor units intermediate the end units of said series comprising:

tramming frame means intermediate the receiving and discharge ends of the conveyor frame of said one conveyor unit including a pair of separate and independent tramming subframes on opposite sides of said conveyor frame, each subframe being separately guided for independent up and and down movement relative to said conveyor frame and having a single mine-bottom-engaging wheel comprising the sole ground support for said subframe and enabling said one conveyor unit to tilt freely up and down as a unit about said wheels;

the receiving end of said conveyor frame engaging the mine bottom to provide, with said two wheels, a three-point ground-stabilized support for the entire said conveyor frame, the receiving end portion of said conveyor frame having track means located between said receiving end and said wheels;

said conveyor frame comprising with the endless conveyor

element and the pulleys associated therewith, a single integral assembly which is vertically tiltably adjustable, as a unit, independently of the tramming frame means, about the point of engagement of its receiving end with the mine bottom, and is rockably adjustable, as a unit, independently of the tramming frame means, about a longitudinal axis extending along the length of the endless conveyor element;

power-actuated elevating means acting between each of said subframes and the corresponding side of said conveyor frame, either of said elevating means when independently actuated being effective to rockably adjust said conveyor frame about said longitudinal axis and thereby adjust the transversely level condition thereof, both of said elevating means when simultaneously actuated being effective to vertically tiltably adjust the entire said conveyor frame about the said point of engagement of its receiving end with the mine bottom and thereby adjust the height thereof relative to the tramming frame means;

a carriage connected to the adjacent inbye mobile conveyor unit and movable thereby back and forth on said track means along the so-stabilized receiving end portion to provide a connection between said one mobile conveyor unit and said adjacent inbye mobile conveyor unit enabling self-tracking variable telescopic movement therebetween;

the discharge end portion having means for connection with an adjacent outbye mobile conveyor unit;

power tramming means for driving said wheels to self-propel said one mobile conveyor unit; and

automatic control means operable in response to movement of the carriage by the adjacent mobile conveyor unit in one direction along the track means to actuate said power tramming means to move said one conveyor unit in the same direction.

4,031,998

AUTOMATIC SORTING CONVEYOR SYSTEMS

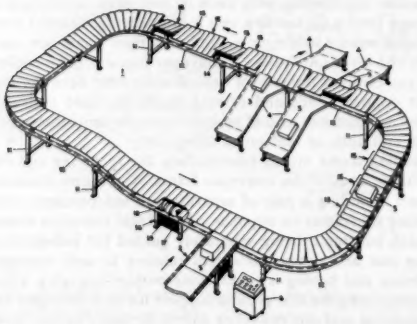
Shin Suzuki, Tokyo; Masami Uesugi, and Michi Sekine, both of Yokohama, all of Japan, assignors to Rapistan, Incorporated, Grand Rapids, Mich.

Filed Mar. 4, 1976, Ser. No. 663,853

Claims priority, application Japan, Mar. 20, 1975, 50-32945

Int. Cl.² B65G *43/00*

U.S. Cl. 198—365 **6 Claims**



1. In an automatic sorting conveyor system including a plurality of support structures to support articles for movement along said conveyor, said support structures being adapted to move in endless fashion along a predetermined path formed by first guide means in said conveyor to thereby receive articles and deposit same at predetermined sorting stations along said path, and driving means for urging said supporting structures along said path, the improvement comprising:

said first guide means being formed centrally along said predetermined path;

each said supporting structure forming an independent article supporting surface including a plurality of slat elements, said slat elements in each said supporting structure being disposed in overlapping relationship;

each said supporting structure including a plurality of carriage means, each said carriage means individually supporting an associated one of said slat elements for movement along said path, said carriage means being supported in said first guide means for movement along said predetermined path;

pivot means on each said carriage means for each of said plurality of slat elements in each said support structure whereby said plurality of overlapping slat elements in each of said support structures can be pivoted about said pivot means and shifted in unison between a level position and a tilted position independently of the position of adjacent upstream and downstream support structures;

actuating means connected to at least one of said carriage means in each of said support structures to cause same to pivot about said pivot means;

second guide means for said actuating means, said second guide means being arranged along said predetermined path on opposite sides of said first guide means and adapted to receive and guide said actuating means to normally maintain said plurality of slats in said level position;

switching means associated with said second guide means, said switching means being disposed proximate said sorting stations along said path, said switching means being adapted for cooperative operation with said actuating means and said second guide means to shift said support structure to said tilted position at said sorting station to thereby deposit articles carried on said support structure at said sorting station.

4,031,999

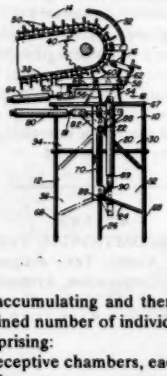
APPARATUS FOR AND METHOD OF ACCUMULATING AND THEREAFTER RELEASING, EN MASSE, A PRE-DETERMINED NUMBER OF INDIVIDUAL, ELONGATED, CYLINDRICAL ARTICLES

Roland W. Wagner, and William K. Switzer, both of Cincinnati, Ohio, assignors to Warrick Equipment Corporation, Cincinnati, Ohio

Filed Jan. 23, 1976, Ser. No. 651,718

Int. Cl.³ B65G *47/44*

U.S. Cl. 198—418 **22 Claims**



1. A device for accumulating and thereafter releasing, en masse, a predetermined number of individual, elongate, cylindrical articles, comprising:

a pair of article-receptive chambers, each having upper and lower open ends;

means selectively and sequentially introducing a plurality of individual, elongate articles into the upper end of one or the other of said chambers;

an upper gate disposed intermediate the upper and lower ends of said chambers and movable between alternate closed, article-supporting and opened, article-releasing positions first in one and then in the other chamber, said gate when in closed position defining the bottom of an article-receptive upper compartment in one or the other of the chambers;

a lower gate disposed adjacent the lower ends of said chambers and movable between alternate closed, article-supporting and opened, article-releasing positions first in one and then in the other chamber, said gate when in closed position defining the bottom of an article-receptive lower compartment in one or the other of the chambers;

actuator means for each of said gates to move them from one to the other of their closed and opened positons; and

control means responsive to the number of articles received in the compartments of said chambers to actuate said actuator means.

4,032,000

TRANSPORT DEVICE FOR CYLINDRICAL OBJECTS ROD-SHAPED, SUCH AS CIGARETTES

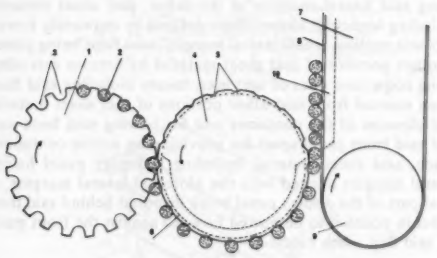
Jean-Francois Leclerc, and Henri Anfossi, both of Orleans, France, assignors to Service d'Exploitation Industrielle des Tabacs et des Allumettes, France

Filed Apr. 2, 1976, Ser. No. 673,081

Claims priority, application France, Apr. 4, 1975, 75.10530

Int. Cl.² B65G *47/57*

U.S. Cl. 198—428 **1 Claim**



1. A device for transporting a plurality of like cylindrical rod-shaped objects such as cigarettes transversely to their longitudinal axis comprising first upstream conveying means and second downstream conveyor means, said first conveying means comprising a cylindrical conveyor having a plurality of like shallow sockets for receiving said objects and said second conveying means comprising a smooth endless belt, said second conveying means being disposed from said first conveying means at a distance such that the length of the shortest perpendicular line from the surface of the second conveying means to the deepest point of the socket is approximately equal to the diameter of the objects, first suction means operable to retain said objects in said sockets over a circumferential portion of said first conveying means which portion terminates approximately in the region of said shortest line, and second suction means operable to retain a pair of said objects contiguously grouped on the ascending portion of said second conveying means which portion begins approximately in the region at which the suction means of said first conveying means terminates.

4,032,001

DETACHABLE CONVEYOR BUCKET APPARATUS

Danny L. Hild, P.O. Box 284, Tribune, Kans. 67879

Filed Sept. 2, 1975, Ser. No. 609,670

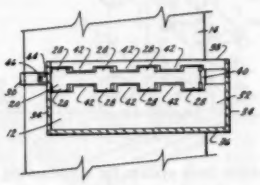
Int. Cl.² B65G *15/00*

U.S. Cl. 198—711 **2 Claims**

1. A detachable conveyor bucket apparatus, the apparatus attached to an endless conveyor belt, the apparatus comprising:

an elongated bracket transversely mounted to the conveyor belt, said bracket having a top and bottom portion with U-shaped bracket flanges extending outwardly therefrom and equally spaced one from the other; and

a bucket having side portions, a front portion, a rear portion and an open top portion, the rear portion having an elongated slot having U-shaped slot flanges, the elongated slot being substantially a mirror image of said elongated bracket, said bracket inserted into the slot and there-



through, said bucket moved laterally along the length of said bracket until the U-shaped slot flanges are positioned behind the U-shaped bracket flanges thereby engaging the rear portion of said bucket between said bracket and the conveyor belt;

a side portion of the U-shaped bracket flanges of said bracket is projected outwardly at an angle to the length of said bracket, the angled side portion used as a guide in sliding the slotted rear portion of said bucket when the rear portion of said bucket is engaged between the conveyor belt and said bracket.

4,032,002

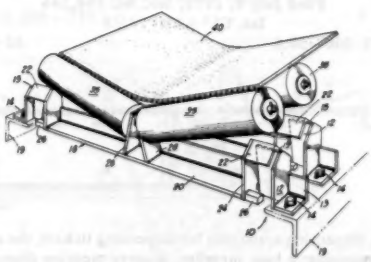
SELF-TRAINING IDLER ASSEMBLY

Allen S. Jackson, Atlanta, Ga., assignor to Clifford G. Hollyfield, Jr., Roswell, Ga., a part interest

Filed Feb. 26, 1976, Ser. No. 661,726

Int. Cl.² B65G *39/16*

U.S. Cl. 198—808 **5 Claims**



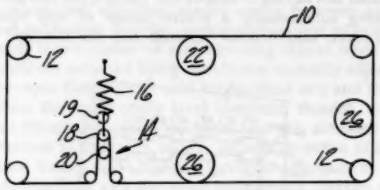
1. Mechanism for automatically training a troughed belt in both of its directions of linear travel comprising a support frame, a series of pendulum cradles on the support frame transversely of and beneath the troughed belt, pairs of transversely inclined divergent axis belt support and training rollers journaled on said pendulum cradles and being swingable bodily with the cradles relative to said support frame, and fulcrum means on said support frame and cradles substantially above the centers of gravity of the cradles from which the cradles and said rollers swing freely and are self-centering under the influence of gravity.

4,032,003

HYDROSTATIC CONVEYOR DRIVE

James S. Hull, Waterford, Mich., assignor to Melvin Corporation, Bay City, Mich.

Filed Apr. 30, 1976, Ser. No. 682,137
Int. Cl.² B65G 23/32
U.S. Cl. 198—855 18 Claims



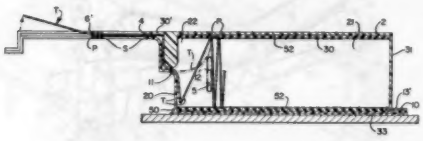
12. A conveyor drive system for maintaining a constant pull on a conveyor independently of load on the conveyor comprising, a closed circuit hydrostatic drive having a variable displacement pump, a fixed displacement motor connected to the conveyor, a supply line for delivering hydraulic fluid from said pump to said motor, a return line for delivering hydraulic fluid from said motor to said pump, control means movable to vary the displacement of said pump, actuating means connected to said control means to move the latter in proportion to the pressure in said supply line to vary the delivery of hydraulic fluid from said pump to said motor to vary the speed of said motor, said actuating means comprising a hydraulic cylinder, means biasing said cylinder in one direction with a constant force, and a fluid conduit communicating said cylinder with said supply line for moving said cylinder in the other direction in response to pressure in said supply line.

4,032,004

TICKET DISPENSING ARRANGEMENT

Francis William Coates, Kings Highway Towers, Apartment A705, Maple-Shade, N.J. 08052

Filed July 9, 1975, Ser. No. 594,246
Int. Cl.² A45C 11/18
U.S. Cl. 206—39.6 45 Claims



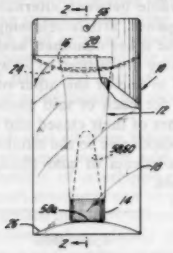
1. A dispensing apparatus for dispensing tickets, the apparatus comprising: a base member; a cover member disposed on said base member including a top wall spaced from said base member, a pair of spaced vertical side walls extending from said top wall to said base member, and a rear wall, said top wall, said side walls and said rear wall of said cover member forming the outer walls of the dispensing apparatus and defining therebetween a chamber for housing a plurality of tickets; a dispensing slot provided at one end of said chamber for dispensing tickets therefrom; a first locking means arranged on the top wall of the cover member for retaining a ticket in said dispensing slot; and a second locking means provided on said base member for preventing re-insertion of a withdrawn ticket into said chamber.

4,032,005

DISPLAY CONTAINERS

William J. Vereb, Ringwood, N.J., assignor to J. & P. B. Myers Inc., Moonachie, N.J.

Filed Oct. 22, 1975, Ser. No. 624,594
Int. Cl.² B65D 5/08, 25/54
U.S. Cl. 206—45.14 19 Claims



1. An article-display container adapted to be flat when stored and to become expanded for containing an article, including a back wall of dimensionally stable sheet material, a front panel of dimensionally stable transparent material, said back wall and said front panel being of substantially equal width and having lateral margins substantially aligned with each other so that the container can be flat for storage, said front panel having bent-over portions united to said back wall along said lateral margins of the latter, said sheet material including lenticular-shaped flaps defined by outwardly bowed arcs intersecting at said lateral margins, said flaps being joined to other portions of said sheet material by creases extending along respective ones of said arcs, means including said flaps when erected from said other portions of said sheet material end closures of the container and for bowing said back wall and said front panel apart for providing an article-containing space, said sheet material including a display panel having lateral margins aligned with the aforesaid lateral margins, at least part of the display panel being disposed behind said front panel in position to be bowed forward against the front panel by said flap when erected.

4,032,006

SHOCK RESISTANT CONTAINER

Victor F. Cantarella, Monroe, and John G. Smith, Warwick, both of N.Y., assignors to International Paper Company, New York, N.Y.

Filed Oct. 13, 1976, Ser. No. 731,880
Int. Cl.² B65D 5/50
U.S. Cl. 206—45.19 23 Claims

1. A unitary blank for constructing a shock resistant container, said blank comprising:

a front wall-forming section, said front wall-forming section comprising first and second front wall-forming panels, each of said front wall-forming panels having weakened longitudinal score lines, to thereby form, respectively, first and second shadow-forming panels;

top and bottom wall-forming panels hingedly connected along longitudinal score lines to a first pair of opposite edges of said front wall-forming section;

first and second tuck flaps hingedly connected along longitudinal score lines to said top and bottom wall-forming panels respectively, one of said tuck flaps having a transverse slot therein;

a pair of end wall-forming panels hingedly connected along a second pair of opposing outer edges of said front wall-forming section along transverse score lines;

a pair of back wall-forming panels, each hingedly connected along one edge of each of said end wall-forming panels along a score line parallel to said transverse score line, each of said back wall-forming panels being approxi-

mately one-half the length of said front wall-forming panels; and

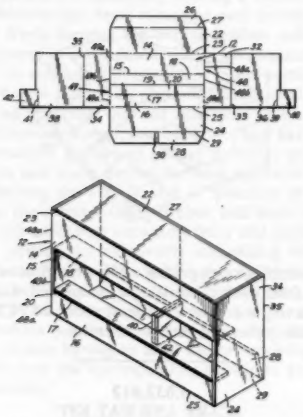
first and second tab means hingedly connected along a transverse score line along a portion of the other edge of each of said back wall-forming panels, said transverse score lines being parallel to the transverse score lines at the opposite edges of said back wall-forming panels.

12. A shock resistant container for holding and displaying a fragile article of merchandise, such as a bottle or a decanter, constructed from a single blank, said container being generally tubular in shape and comprising:

a front wall section consisting of first and second front wall panels;

first and second shadow panels hingedly connected to said first and second front wall panels, respectively, wherein said shadow panels are folded inwardly from the plane of said front wall section to thereby form an aperture in said front wall section;

a pair of oppositely disposed top and bottom wall panels hingedly connected along a first pair of opposing outer edges of said front wall section;



a pair of tuck flaps respectively hingedly connected to said top and bottom wall panels along weakened longitudinal score lines that are parallel to said edges of said front wall section, the tuck flap hinged to said bottom wall panel having a transverse slot therein;

a pair of oppositely disposed end wall panels hingedly connected along a second pair of opposed outer edges of said front wall section;

a pair of back wall panels, each hingedly connected along one edge of each of said end wall panels, said back wall panels overlying said tuck flaps and meeting to thereby form a substantially continuous back wall section for the container; and

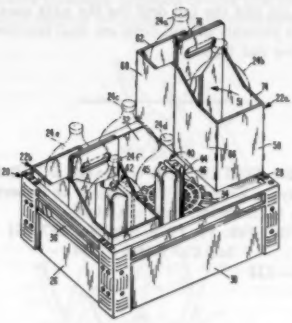
means for simultaneously locking said container in erected position and supporting the article of merchandise contained therewithin, said means comprising first and second tabs which are in face-to-face contact and are hingedly connected to one corner of each of said back wall panels, each of said tab means being folded at a right angle to said back wall section, each of said tab means being inserted into the slot formed in said tuck flap.

4,032,007

TWO-BOTTLE BASKET CARRIER

Earl J. Graser, and Jerry F. Wilson, both of Monroe, La., assignors to Olinkraft, Inc., West Monroe, La.

Filed Oct. 19, 1976, Ser. No. 733,782
Int. Cl.² B65D *75/00*
U.S. Cl. 206—173 **13 Claims**



1. A two-bottle carrier for use with a shipping case which is adapted to contain at least four bottles wherein the shipping case has at least one split divider post for separating the bottles in the case, the carrier comprising

a pair of side walls,

a pair of end walls extending between opposite ends of the pair of side walls,

a bottom,

said bottom having an opening midway between the end walls and adjacent one of the side walls for receiving one half of the split divider post, and

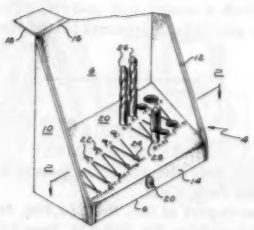
a center partition extending from the other side wall and spaced from the one side wall to accommodate the one half of the split divider post between the one side wall and the center partition.

4,032,008

TOOL HOLDER GUIDE INDICIA FOR TAP AND DRILL SETS

Richard N. Vecchiarelli, 64 Prospect St., Ludlow, Mass. 01056

Filed June 7, 1976, Ser. No. 693,735
Int. Cl.² B65D *85/24*
U.S. Cl. 206—379 **4 Claims**



1. Tool holder for a plurality of taps and a plurality of drills disposed therein comprising means for holding said taps in a predetermined succession according to the diametrical size of said taps, means spaced from the succession of taps for holding said drills in a predetermined succession related to the diameter thereof, each of said tap and drill holding means being adapted to receive and hold a drill and tap of a given size, and indicia which lead from each tap holding means toward a pair of adjacent drill holding means adapted to hold drills of different diametrical size, one of said pair of drills

being the tap drill for the tap from which one of said indicia leads and the other of said pair being the clearance drill toward which the other of said indicia leads, said indicia including adjacent pairs thereof which extend toward each of a plurality of said drill holding means in converging relation, each drill holding means toward which said indicia extend in converging relation being adapted to hold one drill of the proper diametrical size to serve as both the clearance drill for one of said taps and the tap drill for the next successive size tap whereby a plurality of said drills are dual functional for use with successive size taps.

4,032,009

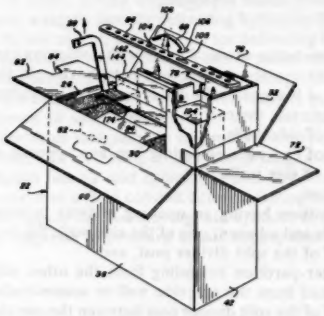
CONTAINER SYSTEM FOR GARAGE DOOR OPENER

Robert E. Taylor, Evanston, Ill., assignor to Robert E. Taylor and Aaron M. Schmidt, both of Chicago, Ill.

Filed Feb. 11, 1976, Ser. No. 657,051

Int. Cl.² B65D *81/04*

U.S. Cl. 206—321 **10 Claims**



1. A compact container system for holding components of a remote controlled electric garage door opener, comprising, in combination:

a. a variable capacity container for holding at least one of a transmitter and a receiver;

b. a twin compartment container including a first compartment and a second compartment for holding the variable capacity container; and

c. a corrugated cardboard carton having a plurality of hinged panels defining end walls and sidewalls for snugly holding both a motor unit and the twin compartment container generally in adjacent relationship.

4,032,010

MARKER ASSEMBLY

Joseph H. Evans, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 580,596, May 27, 1975, which is a division of Ser. No. 369,836, June 14, 1973, Pat. No. 3,894,731. This application July 23, 1975, Ser. No. 598,412

The portion of the term of this patent subsequent to July 15, 1992, has been disclaimed.

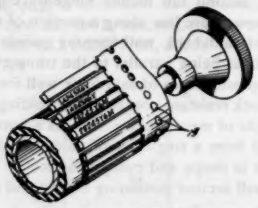
Int. Cl.² B65D *85/20*

U.S. Cl. 206—345 **5 Claims**

1. An assembly comprising

a carrier, said carrier including a base and projections extending from said base; and

a plurality of tubular sleeves, said sleeves being snugly and slidably disposed over said projections so as to admit of removal of said projections when drawn past the ends thereof, said sleeves being of heat recoverable material and dimensionally unstable on said projections such that



said sleeves are heat recoverable to a lesser transverse dimension when removed from said projection.

4,032,011

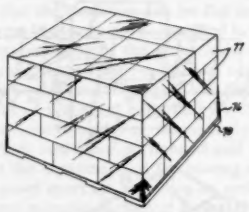
PACKAGING ASBESTOS FIBERS

Gerard Lucien Lambert, Asbestos, Canada, assignor to Johns-Manville Corporation, Denver, Colo.

Division of Ser. No. 438,969, Feb. 4, 1974. This application Feb. 26, 1976, Ser. No. 661,576

Int. Cl.² B65D *19/00*

U.S. Cl. 206—386 **2 Claims**



1. An assemblage comprising a plurality of dense packages of asbestos fiber each comprising a compacted mass of asbestos fibers having a density of at least about 90 PCF, arranged on a pulpable pallet and secured thereto.

4,032,012

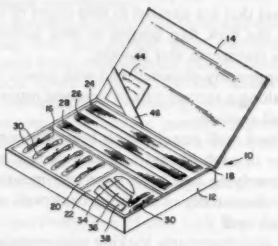
SCARF AND HAT KIT

Enola Bishop, 5808 N. Winthrop, Chicago, Ill. 60660

Filed Aug. 24, 1976, Ser. No. 717,035

Int. Cl.² B65D *69/00*

U.S. Cl. 206—574 **7 Claims**



1. A sewing kit for forming an article of clothing comprising:

a covered box having

a plurality of upright partitions therein dividing said box into a plurality of compartments,

a plurality of fabric strips in one of said compartments

which when sewn together form an article of clothing, and

a plurality of individual yarn lengths having at least one needle permanently attached to an end thereof in another one of said compartments for sewing said fabric strips together to form said article of clothing whereby the needles remain a part of the finished article as decoration therefor.

4,032,013

APPARATUS FOR ARRANGING AND STORING BOBBINS OF YARN OR THREAD

Kimiko Matsumoto, 324-1, Oaza-Shirakibaru, Onojo, Fukuoka, Japan

Continuation of Ser. No. 476,416, June 4, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,338

Int. Cl.² A47F 7/00; B65H 49/02

U.S. Cl. 211—13 **2 Claims**

1. Apparatus for storing bobbins of yarn or thread comprising, a frame having a plurality of horizontal, vertically spaced, rod-like crosspieces spaced vertically from each other a distance greater than the axial length of a bobbin and used in an upstanding position in use, a plurality of bobbin-holders for storing bobbins with yarn or thread individually depending therefrom on respective ones of said crosspieces, each bobbin-holder having an insert portion insertable axially into an axial bore of a bobbin for removably holding a bobbin depending on said bobbin-holder, hook means on each bobbin-holder for removably freely hanging the bobbin-holders individually on said crosspieces in a condition with a corresponding bobbin suspended on said insert portion, said insert portion comprising a split, hollow cylindrical portion of lesser axial length than a bobbin and insertable into the axial bore of a bobbin in an inwardly compressed state, said bobbin-holder having another hollow cylindrical portion of greater diameter as an upward extension on said insert portion defining therewith an annular shoulder limiting the axial extent of insertion of said insert portion into the corresponding bobbin, said hook means comprising a hook extending outwardly from said another hollow cylindrical portion for removably suspending said bobbin-holder on a crosspiece with a bobbin depending therefrom for removal of the individual bobbin-holder and the corresponding bobbin from the crosspiece jointly and for return to a hanging position jointly on a crosspiece, and said another cylindrical portion having an axial slit for receiving an end of yarn therein from the corresponding bobbin to avoid thereof from said bobbin.

4,032,014

DISPLAY EASEL

Donald P. Weiss, Kinnelon, N.J., assignor to Advertising Displays Corporation, Englewood Cliffs, N.J.

Filed Jan. 30, 1976, Ser. No. 653,663

Int. Cl.² A47F 7/00

U.S. Cl. 211—49 R **1 Claim**

1. A display rack which can be readily erected between a collapsed and erected position comprising:

a plurality of transversely and longitudinally extending ribs to define a back panel,

support means including a pair of spaced apart leg members hingedly connected to a transversely extending rib, whereby said leg members can be folded between a collapsed and erected position,

complementary base member hingedly connected to a transversely extending rib spaced from said first mentioned transversely extending rib,

said base member being readily folded between an erected and collapsed position,

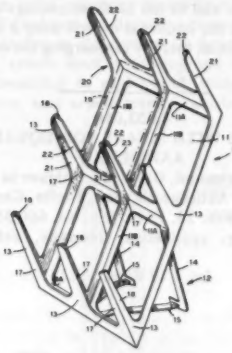
said leg members and base member having complementary interlocking means for locking said members in the erected position,

and a plurality of brackets connected to said longitudinal and transversely extending ribs so as to project normal thereto,

said brackets being disposed at the points of intersection of said longitudinally and transversely extending ribs,

said brackets including angularly disposed side walls, whereby the complementary sides of opposed brackets define a support adapted for holding therebetween a plurality of articles to be displayed,

said brackets including opposed corner brackets having the side walls thereof disposed at substantially right angles,



and intermediate brackets disposed between said corner brackets,

said intermediate brackets having a side wall which is common to the complementary side walls of said corner brackets,

said side walls of the brackets being arranged so that the compartments defined thereby are in open communication with one another.

4,032,015

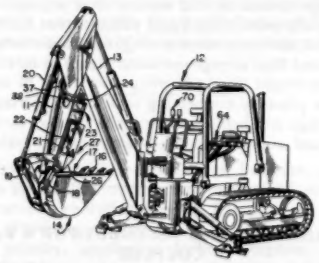
BUCKET CLEANER AND CONTROL FOR A DIGGING MACHINE

Charles Wayne Hemphill, Duncanville, Tex., assignor to Adco Company, Dallas, Tex.

Filed June 23, 1976, Ser. No. 698,906

Int. Cl.² E02F 3/80, 3/85

U.S. Cl. 214—767 **17 Claims**



8. In a backhoe type digging machine having a dipper stick to which there is pivotally mounted a bucket, and having means by which the bucket is moved from an uncurled into a curled configuration;

with the bucket having opposed side walls, and a curved bottom wall connecting the side walls together and forming a rear wall to leave a digging end spaced from the rear wall, the improvement comprising:

a bucket cleaning apparatus comprised of a blade manner; a housing; a guide member; means by which said blade member is affixed to said housing, means slidably captur-

ing said housing to said guide member such that said housing can slidably move in captured relationship respective to said guide member;

means by which said guide member is affixed to a marginal length of said dipper stick in spaced relationship respective to the connection by which the bucket and dipper stick are pivotally joined;

means by which said housing is moved along said guide member towards and away from said bucket such that said blade member can be extended into engagement with the bottom of the bucket with a progressive movement to cause the free end of the blade to contact the bottom of the bucket as the bucket is moved from a curled into an uncurled position; thereby discharging the contents of the bucket.

4,032,016
MOBILE CRANE WITH MEANS FOR EQUALIZING THE AXLE LOAD

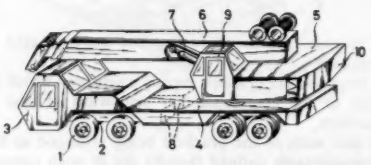
Wilfried Gräf, Dortmund, Germany, assignor to O & K Orenstein & Koppel Aktiengesellschaft, Berlin, Germany

Filed Feb. 23, 1976, Ser. No. 660,359

Claims priority, application Germany, Feb. 21, 1975, 2507476

Int. Cl.² B66C *23/72*

U.S. Cl. 212—49 **6 Claims**



4. A mobile crane which includes: a lower carriage having a front section, an upper carriage having a first end portion adapted to support an operator's stand and also having a second end portion opposite said first end portion, first fluid storage container means arranged at said front section of said lower carriage, second fluid storage container means arranged at said second end portion of said upper carriage, conduit means leading from said first to said second fluid storage container means, pump means interposed in said conduit means and operable selectively to pump fluid from said first fluid storage means to said second fluid storage container means thereby permitting liquid which serves for equalizing axle loads of the crane when driving over roads to be pumped to said second fluid storage container means to serve as ballast and counterweight during hoisting operations of said crane, and means pivotally connecting said upper carriage to said lower carriage and being provided with passage means therethrough, said conduit means passing through said passage means.

4,032,017
ADJUSTABLE BRACKET ASSEMBLY FOR A RAIL CAR COUPLER

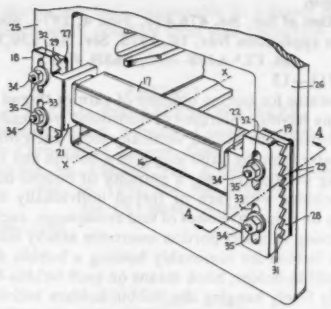
Glen D. Larsen, Upper Marlboro, Md., assignor to Southern Railway Company, Washington, D.C.

Continuation-in-part of Ser. No. 572,861, April 29, 1975, Pat. No. 3,987,907. This application May 13, 1976, Ser. No. 686,098

Int. Cl.² B61G *7/12*

U.S. Cl. 213—61 **9 Claims**

6. In a rail car with a coupler having its shank portion resting on a coupler carrier member and bracket members supporting said carrier member at opposite ends thereof, said bracket members and said carrier member comprising a bracket assembly capable of being incrementally adjusted vertically relative to side plates of the rail car, said carrier member having opposing bearing surfaces, said bracket members each having at least one vertically elongated opening therein, each said bracket member having opposing surfaces lying parallel to said side plates, at least one of said surfaces having horizontally extending toothed serrations thereon of a predetermined tooth size, lock means on said side plates, said lock means including toothed serrations of a tooth size equal to said predetermined tooth size, fastener elements on said lock means extending through said elongated openings, one of said bearing surfaces lying in a plane containing a trough between a pair of adjacent teeth of said bracket member serrations, and the other of said bearing surfaces lying in a



second plane containing an apex of one of the teeth of said bracket member serrations, said serrations of said lock means and of said bracket members being intermeshed, and said planes being shiftable relative to said side plates, when said carrier member is in a first position, by an amount equal to at least the size of said one of said teeth, said planes being further shiftable relative to said side plates by an amount equal to at least one-half the size of said teeth, when said carrier member is moved to a second position inverted from said first position as by rotating the bracket assembly 180° about an axis perpendicular to said side plates, and means engaging said fastener elements for retaining said bracket members and said lock means together.

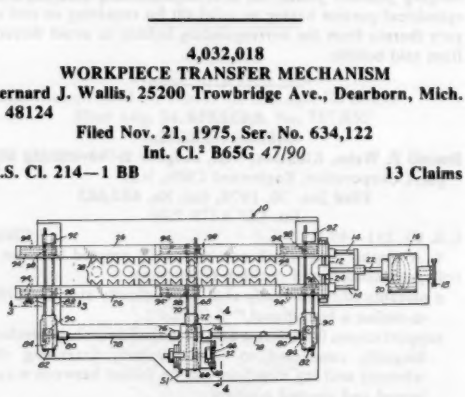
4,032,018
WORKPIECE TRANSFER MECHANISM

Bernard J. Wallis, 25200 Trowbridge Ave., Dearborn, Mich. 48124

Filed Nov. 21, 1975, Ser. No. 634,122

Int. Cl.² B65G *47/90*

U.S. Cl. 214—1 BB **13 Claims**



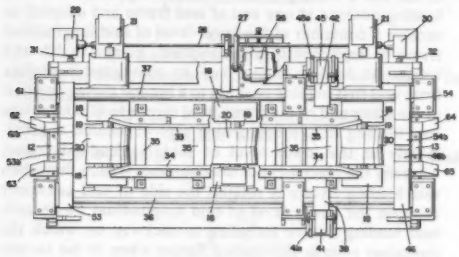
1. In a device for transferring workpieces between successive stations of a die mounted in a stamping press, said transfer device being of the type which comprises a base, a carriage reciprocable on said base in a linear path through a stroke corresponding to the distance between the successive stations in the die and a finger bar mounted for movement with the carriage and for reciprocating movement transversely of the path of travel of the carriage between work engaging and

retracted positions, that improvement which comprises means for actuating the finger bar to said work engaging and retracted positions comprising a cam adapted to be mounted on and reciprocate in a linear path with the ram of the press, said cam having a track thereon extending generally in the direction of said linear path of reciprocation of said ram and having a portion offset transversely of said last-mentioned linear path, a crank rotatably mounted on said base, a cam follower on said crank and adapted to be interengaged by said cam track and to be displaced by said offset portion thereof in response to said reciprocation of the ram to rotate said crank in opposite directions and means operably interconnecting said crank and said finger bar for shifting the finger bar between said work engaging and retracted positions in response to rotation of said crank.

4,032,019
BILLET CONVEYOR AND TURNER

Stanley Darwin Noll, Shaker Heights, and William F. Delfeld, Lyndhurst, both of Ohio, assignors to Production Experts, Inc., Cleveland, Ohio

Filed Aug. 25, 1975, Ser. No. 607,216
Int. Cl.² B65G 7/00
U.S. Cl. 214—1 QG **6 Claims**



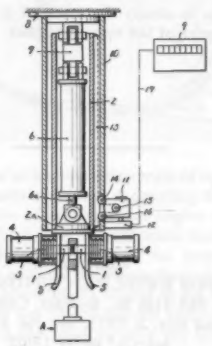
1. In a billet turner, billet turner mechanism comprising a pair of spaced parallel shafts, means for selectively imparting oscillatory movement to said shafts about their axes, billet support levers secured to said shafts, each of said levers including a billet support, said billet support of each of said levers being normally disposed in a common horizontal plane, and a flip lever pivotally secured to each of said first-named levers and movable relative to the latter whereby when one of said parallel shafts is rotated about its axis, its billet support lever will cause the billet support to be elevated out of said common plane and its flip lever will cause the billet to be moved along said billet support extension to the end of said extension and to fall by gravity onto the billet support extension of the other lever, and simultaneously turn about the longitudinal axis of the billet.

4,032,020
ARTICLE EXCHANGING APPARATUS

Shozo Kato; Yutaka Takahashi, both of Nagoya; Yorio Miyaji, Osaka; Naomitsu Kondo, Osaka, and Mikio Fukumoto, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited and Kabushiki Kaisha Miyazaki Tekkosho, both of Osaka, Japan

Filed Apr. 7, 1975, Ser. No. 565,714
Claims priority, application Japan, Apr. 5, 1974, 49-39203
Int. Cl.² B66C 13/16
U.S. Cl. 214—1 BB **4 Claims**

1. In an article exchanging apparatus for removing a consumed article from a processing unit and replacing same with a fresh consumable article having base plate means for engagement with transporting apparatus capable of being moved substantially horizontally, lifter means secured at one end to said base plate means in suspended relationship thereto, and article gripping means secured to the opposite end of said lifter means for releasably engaging a fresh or consumed article, the improvement of an article level unit for insuring the proper replacement of a fresh article for a consumed article at the same level at which the consumed article was at the time of its removal, said article level unit comprising load switch means interposed between the base plate means and the lifter means to constitute the connection therebetween, said switch means being actuatable by the weight of the article and the associated parts to which it is connected, means for detecting the vertical displacement of the consumed article operatively associated with the lifter means and the article gripping means, pulse generator means operatively connected to said vertical displacement detecting means for generating a signal corresponding to the upward or downward movement of the article, article level measuring and indicating means operatively connected to said switch means to said pulse generator means, said article level measuring and indicating



means including an indicator unit operable to give a value corresponding to the level of the article whereby said article level measuring and indicating means will be actuated by said switch means upon the raising of a consumed article and which will receive a pulse generator signal to indicate the vertical displacement of the consumed article in terms of a fixed value on said indicator unit, said switch means will be closed upon release of the consumed article and will be reactuated upon engagement by said article gripping means of a fresh replacement article and will give on said indicator unit the vertical displacement of the fresh article in terms of a fixed value and the vertical height of the fresh article will thereafter be adjusted to give a zero value setting corresponding to the final reference value thereby placing the fresh article at a level coinciding with the level of the consumed article at the time it was withdrawn.

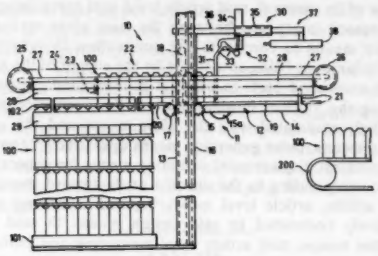
4,032,021
DEPALLETIZERS

Michael David Mabey, Bishampton, near Pershore, and James Malcolm Foster, Harrowgate, both of England, assignors to Depallorator Corporation Limited, Ireland

Filed Aug. 22, 1975, Ser. No. 607,064
Claims priority, application United Kingdom, Aug. 23, 1974, 37206/74
Int. Cl.² B65G 59/02
U.S. Cl. 214—8.5 F **5 Claims**

1. A depalletiser for unloading tiers of goods from a pallet onto a take-off surface, said pallet having an uppermost tier, said depalletiser comprising vertical support means; a horizontal platform supported by said vertical support means; lift means for displacing said platform vertically up and down the support means so as to sequentially aline the platform with the uppermost tier on the pallet and with the take-off surface and transfer means movable with the platform for displacing tiers of goods from the pallet onto the platform and from the platform onto the take-off surface; and

means movable with the platform for locating about the tier of goods immediately below the uppermost tier on the



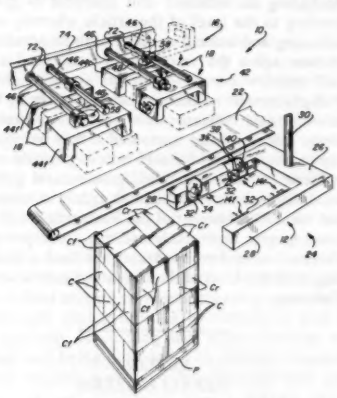
pallet so as to steady the stack of goods on the pallet during transfer of the uppermost tier.

4,032,022

APPARATUS FOR HANDLING CARTONS AND THE LIKE

John S. Smith, 965 11th St., Boulder, Colo. 80302

Filed Nov. 3, 1975, Ser. No. 628,518
Int. Cl.² B65G *59/02*
U.S. Cl. 214—8.5 C **9 Claims**



1. Apparatus for handling cartons and the like comprising in combination:

first releasable gripping means adapted to releasably grasp a plurality of cartons, said first gripping means including first separating means for separating at least some of the cartons gripped by the first gripping means from other cartons gripped by the first gripping means,

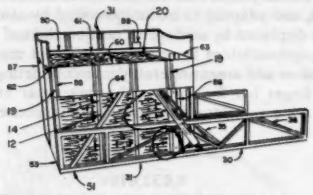
second releasable gripping means for grasping the separated cartons held by the first gripping means and removing the cartons grasped by the second gripping means from the first gripping means when the cartons are released by the first gripping means, said second gripping means being movable relative to said first gripping means and including second separating means adapted to further separate cartons grasped by said second gripping means and deposit the further separated cartons at a pre-selected location.

4,032,023

APPARATUS FOR LOADING TOBACCO IN BARNS

Frank W. MacIntosh, Mt. Holly, N.C., assignor to Gas-Fired Products, Inc., Charlotte, N.C.

Filed Mar. 29, 1976, Ser. No. 671,279
Int. Cl.² B65G *47/00*
U.S. Cl. 214—16.4 R **5 Claims**



1. Apparatus for loading leaf tobacco for curing comprising in combination,

a. an air permeable container for receiving and supporting the tobacco during curing;

b. a loading device including a longitudinal frame stationary in use and a loading fixture pivotally supported in a first loading position at one end of said frame and adapted to receive a container at the lower level of said longitudinal frame in said first loading position, means to lift and rotate the loading fixture and its associated container from said first loading position to a second curing position at the other end of the frame, said means to lift and rotate said loading fixture comprising a pivot located approximately at the lower level of said longitudinal frame, whereby the placement of the container is such that when said loading fixture is rotated the side of said container rests on the upper level of said longitudinal frame and, said loading fixture including a trackway on which the container rests in the loading fixture when in the second or curing position; and

c. a tobacco curing barn adjacent said loading device and including a trackway in alignment and as an extension of said trackway in said loading fixture when in the second or curing position.

4,032,024

APPARATUS FOR DISTRIBUTION OF CHARGE MATERIAL IN SHAFT FURNACES, PARTICULARLY HIGH PRESSURE BLAST FURNACES

Ulrich Genge, Duisburg, and Manfred Eutenereu, Neukirchen-Vluyn, both of Germany, assignors to Demag Aktiengesellschaft, Germany

Filed Nov. 12, 1975, Ser. No. 631,071
Claims priority, application Germany, Nov. 26, 1974, 2455767
Int. Cl.² B66C *17/08*
U.S. Cl. 214—35 R **11 Claims**

1. Apparatus for evenly distributing charge material to shaft furnaces, comprising

a. a furnace with a stationary hopper disposed in the top of said furnace;

b. an annular support disposed in said furnace adjacent the bottom of said hopper and arranged to pivot on a first horizontal axis extending through said furnace;

c. a distributor pipe disposed on said support and arranged to pivot in vertical plane on a second horizontal axis on said support;

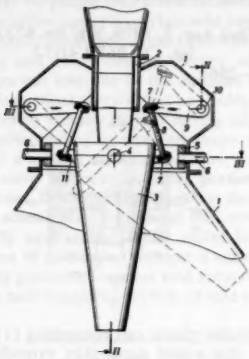
d. said first and second horizontal axes being perpendicular to each other; characterized by

e. reversible drive means positioned outside the wall of said furnace;

f. first means connecting said drive means to said annular support for the pivoting thereof around said first axis;

g. linkage means connecting the circumferential edge of

said distributor pipe to said drive means to pivot said pipe around said second horizontal axis;

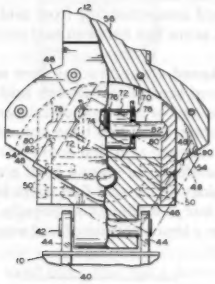


h. said linkage means including a non-fixed universal connecting said drive means and said distributor pipe.

4,032,025
BACKHOE BUCKET TILT

Warren N. Ross, Hermiston, Oreg., assignor to Audie B. Tomlinson, Cove, Oreg.

Filed June 20, 1975, Ser. No. 588,702
Int. Cl.² E02F *3/86*
U.S. Cl. 214—138 R **4 Claims**

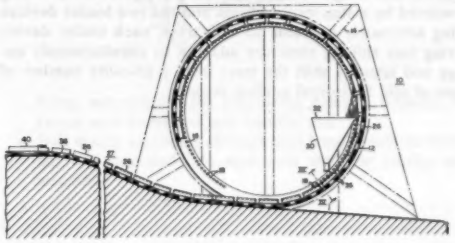


1. In a backhoe, a main boom, a jib boom having an upper end and a lower end, a forked member having an upper end rigidly secured to the lower end of the jib boom and having a lower bifurcated end, a yoke pivotally mounted on the lower bifurcated end of the forked member on a tilt axis and having its arms extending upwardly between said bifurcated end, a bucket pivotally mounted on the lower end of the yoke for pivotal movement on the yoke on a bucket pivot axis transverse to said tilt axis, first manually controlled means for pivoting the bucket about said bucket pivot axis, a double-ended fluid cylinder pivotally mounted between the bifurcated end of the forked member on a third axis above and parallel to said tilt axis locating said cylinder between the arms of the yoke, said fluid cylinder including a housing having a central piston and a rod at each end extending outwardly of said housing parallel to said bucket pivot axis, one rod engaging with one arm of the yoke and the other rod engaging with the other arm of the yoke, the total length of the rods at least equal to the spacing between the arms of the yoke so that the rods always engage both arms, second manually controlled means for said fluid cylinder, the extension of a selected rod resulting in the simultaneous retraction of the other rod and the exertion of a direct force upon a selected arm of the yoke by said selected rod thereby selectively pivoting said yoke and bucket around said tilt axis by said selected rod.

4,032,026
BULK HAULING FREIGHT CAR UNLOADING APPARATUS AND METHOD OF OPERATION

Paul W. McCormick, 200 Lee Drive, Coraopolis, Pa. 15108

Continuation of Ser. No. 387,804, Aug. 13, 1973, now Defensive Publication No. T922,002. This application Feb. 10, 1976, Ser. No. 656,987
Int. Cl.² B65G *67/34*
U.S. Cl. 214—152 **3 Claims**

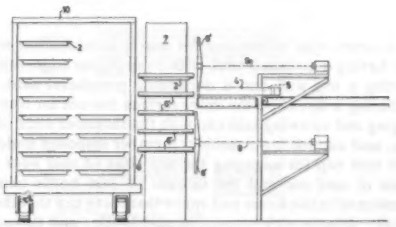


1. The method of unloading a first train of open hopper cars containing bulk material without decoupling the cars comprising pushing the train of cars by a rear engine through a vertically extending helical, 360° loop of track such that the open ends of the cars face the center of the loop; retaining the contents in the car until the car passes through the first quadrant of the loop, connecting an engine to the front car of the train after the latter has passed entirely through the loop and continuing to move the train through the loop through the pushing and pulling forces respectively of the front and rear engines.

4,032,027
AUTOMATIC TRAY LOADING DEVICE

Gunnar V. Lindberg, Vallingbyvagen 212, 162 21 Vallingby, Sweden

Filed Aug. 18, 1975, Ser. No. 605,230
Int. Cl.² B65G *47/00*
U.S. Cl. 214—16.6 **4 Claims**



1. An automatic tray loading apparatus for use in combination with a single level tray conveying means to transfer trays from the conveying means to a tray transport van which has a plurality of vertically spaced tray receiving racks said conveying means conveying trays along a single horizontal path to a transfer station, said loading apparatus comprising: a vertically movable magazine unit including a number of pairs of horizontal guiding means each being capable of receiving at least one tray, said pairs being spaced one above the other and together constituting a unit; side pillars along which said magazine unit is vertically guided; means for moving said magazine unit upwards and downwards in steps, each step being equal to the vertical distance between adjacent pairs of tray guiding means; one side of said magazine unit being a tray

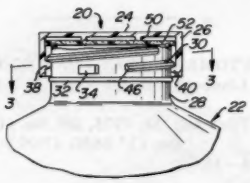
input side between said pillars and said input side being disposed adjacent said transfer station at the side of and parallel with the tray conveying means; a magazine loader at said transfer station disposed adjacent said magazine input side and adapted to laterally reciprocate and engage and shift at least one tray sideways from the conveying means onto an adjacent pair of horizontal guiding means; loading means for horizontally shifting vertically carried trays from said magazine unit to the tray transport van comprising, a first loader device located under the magazine loader and adjacent said magazine input side and a second loader device located above both the first loader device and the magazine loader and adjacent said magazine input side, each loader device being powdered by a step motor means and the two loader devices being alternately operable to shift trays, each loader device having tray shifting structure adapted to simultaneously engage and laterally shift the trays from a plurality number of pairs of said horizontal guiding means.

4,032,028

SAFETY CAP

Oscar Reiss, Great Neck; Leon R. Brynes, Brooklyn, and Frank De Cicco, Hamilton Beach, all of N.Y., assignors to APL Corporation, New York, N.Y.

Filed Sept. 13, 1976, Ser. No. 722,949
Int. Cl.² B65D *85/56, 55/02;* A61J *1/00*
U.S. Cl. 215—217 **4 Claims**



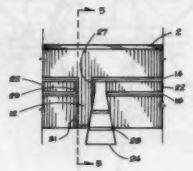
1. A screw-type safety cap for use in combination with a bottle having a threaded neck with a top planar edge, said cap including a top wall and a depending peripheral skirt, said skirt having a thread on the inner surface thereof for rotatably engaging and screwing said cap with the threaded neck of said bottle, said cap having a resilient member disposed under the top of said cap for engaging the top edge of said neck, said threads of said cap and the threads on said bottle being so dimensioned in thickness and space therebetween that the cap is axially slidable with respect to said bottle, said threads on said bottle having at least two interruptions which form at least two recesses in the threads of said bottle, said cap having at least two projections on the inner surface of said skirt, said projections being spaced both axially and radially with respect to each other, as are the two recesses in said bottle thread, the projection on said skirt which is most spaced from the top of said cap being dimensioned so that it is too large to fit in any recess of said bottle other than the recess lowest on the neck of said bottle, said cap being secured to said bottle by rotating said cap until all of said projections are aligned with said recess, said resilient member causing said cap to be urged away from said bottle and the projections to be disposed in said recesses whereby said cap in locked on said bottle and cannot be removed unless the user presses said cap against the bottle to dislodge said projections from said recesses to enable unscrewing said cap.

4,032,029

TAMPER-PROOF BOTTLE CAP AND CONTAINER

Benjamin Arthur Cochrane, 181 Sonora Ave., Danville, Calif. 94526

Filed Apr. 5, 1976, Ser. No. 673,630
Int. Cl.² B65D *41/32*
U.S. Cl. 215—256 **13 Claims**



1. A deformable plastic cap comprising (1) a top disk, (2) a cylindrical thin-walled outer skirt extending substantially perpendicularly from said disk, and (3) a cylindrical inner skirt extending substantially perpendicularly from said disk enclosed within said outer skirt and substantially coaxial therewith;

said outer skirt scored along a circumferential first score line below said disk and scored along a circumferential second score line downwardly spaced from said first score line, said first and said second score lines forming (a) a weakened cylindrical band traversing said outer skirt in an arc from about 250° to about 358° and (b) a narrow strip between the ends of said cylindrical band from the incompleted arc;

a tab attached to one end of and extending outwardly from said cylindrical band;

a first weakened area extending from said first score line to said second score line between said narrow strip and said tab;

a second weakened area extending from said first score line to said second score line between said narrow strip and the opposite end of said cylindrical band from said tab;

a narrow circumferential first bead around the inside of said outer skirt between said first score line and said disk;

a narrow circumferential second bead around the inside of said outer skirt below said first score line; and

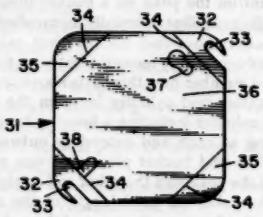
a third score line extending downwardly from said second score line to a lower portion of said outer skirt below said second bead.

4,032,030

MODIFIABLE UTILITY OUTLET BOX COVER ELEMENT

David L. Bass, 2407 Lofurno Road, Chesapeake, Va. 23323, and Kenneth B. Meador, 403 Anndora Road, Portsmouth, Va. 23701

Filed Dec. 23, 1976, Ser. No. 753,851
Int. Cl.² H02G *3/14*
U.S. Cl. 220—3.8 **2 Claims**



1. A modifiable cover element for a utility outlet box comprising a sheet of relatively thin material at least initially having an edge outline corresponding in size and shape to the

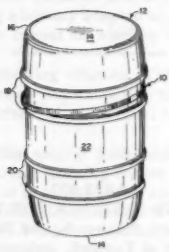
frontal configuration of a first utility outlet box, said cover element having openings or the like formed therein through which screws may be passed into screw receiving means carried by said first utility outlet box when said cover element is congruently frontally positioned against said first utility outlet box for securing said cover element thereto, said cover element having slots cut into one of the surfaces thereof along which removable portions thereof may be readily broken away to leave a remaining portion thereof having an edge outline substantially corresponding in size and shape to the frontal configuration of a second utility outlet box, said remaining portion of said cover element including portions readily removable therefrom to define openings or the like therein through which screws may be passed into screw receiving means carried by said second utility outlet box when said remaining portion of said cover element is substantially congruently frontally positioned against said second utility outlet box for securing said remaining portion of said cover element thereto.

4,032,031

PLASTIC DRUM WITH LIFT RING

Paul Belokin, Jr., Hayward, Wis., assignor to K and M Rubber Company, Elk Grove Village, Ill.

Filed Oct. 12, 1976, Ser. No. 731,621
Int. Cl.² B65D *25/00, 7/42*
U.S. Cl. 220—85 R **4 Claims**



1. In combination with a drum of synthetic material of the type which has relatively unobstructed substantially rimless ends not readily engageable for handling and having at least one pair of annular roll ridges spaced apart on the exterior of and located near one axial end of the drum, means for securing the drum to a hand truck that has a downwardly engaging hook device thereon, said means comprising:

a loose circlet of a diameter greater than the diameter of the drum between said roll ridges and smaller than the outer diameter of said roll ridges, formed of a material having sufficient strength to withstand the tension applied in handling said drum through the engagement of said hand truck hook device with the circlet, between the circlet and the drum surface between said roll ridges.

4,032,032

FLAME GUARD ANTI-ROTATION DEVICE

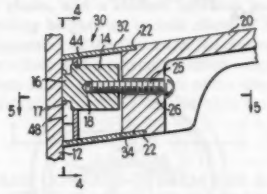
William Michael Carroll, 1111 E. Dean Road, Milwaukee, Wis. 53217, and John Day, Studio House, Shatterford, Warley, Worcestershire, England

Filed May 4, 1976, Ser. No. 682,839
Int. Cl.² B65D *25/28*
U.S. Cl. 220—94 R **11 Claims**

1. In a cooking utensil having a vessel with weld stud mounted thereon and a handle extending from said weld stud, an improved safety interlock between said handle and said vessel, said interlock comprising:

a. a non-circular tubular member having ends interfacing with the vessel and the adjacent end of the handle, and extending over said weld stud;

b. separate interlock means within said tubular member spaced from the adjacent end of said handle and having an aperture extending over and frictionally engaging said weld stud and a periphery engaging said tubular member, said weld stud, interlock means and said tubular member



being non-annular for precluding relative rotation between said vessel and said handle; and

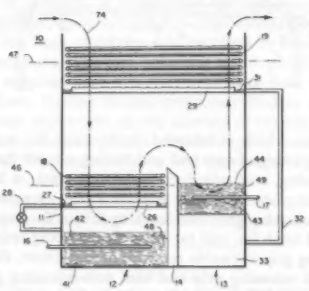
c. bolt means extending through said handle, tubular member and threaded into said weld stud for joining said assembly.

4,032,033

METHODS AND APPARATUS FOR HEATING ARTICLES

Tze Yao Chu; Yogesh Jaluria, both of Lawrence Township, Mercer County; Peter Frederick Lilienthal, II, Princeton, and George Michael Wenger, Franklin Township, Somerset County, all of N.J., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Mar. 18, 1976, Ser. No. 668,012
Int. Cl.² H05K *3/34;* **B23K** *3/04*
U.S. Cl. 228—200 **7 Claims**



1. A method for heating an article to an elevated temperature in a condensation heat transfer facility which is open to the atmosphere, comprising the steps of:

transporting the article into the facility, through a body of secondary vapor, into a body of hot saturated primary vapor;

heating the article to the elevated temperature by condensing the primary vapor thereon to transfer the latent heat of vaporization to the article;

removing the article from the hot saturated primary vapor; and

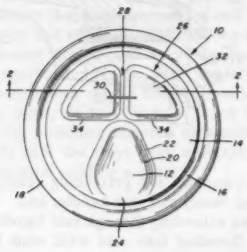
immersing the article in a liquid prior to withdrawal of said article from the facility.

4,032,034

PRESSURE RELEASE DEVICE FOR A CONTAINER

Wilburn Coy Willis, Hagerstown, Ind., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 18, 1976, Ser. No. 742,893
Int. Cl.² B65D 41/32
U.S. Cl. 220—266 **11 Claims**



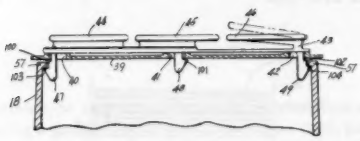
1. In a container having a vent release means comprising a container wall having an inwardly projecting hollow rib and a weakening line across the rib, an improveent comprising walls transverse to the longitudinal axis of said rib and to the general plane of said container adjacent to both ends of said rib, which improvement minimizes effects of changes in internal pressure of said container on the force required to rupture said weakening line.

4,032,035

CHILD-RESISTANT COVER FOR CONTAINERS

Joseph J. Tepas, Jr., Easton, Conn., and Arlon G. Sangster, Sterling, Mass., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 437,077, Jan. 28, 1974, Pat. No. 3,870,471. This application Mar. 7, 1975, Ser. No. 556,362
Int. Cl.² B65D 45/16
U.S. Cl. 220—318 **22 Claims**



1. A cover which is adapted to be used for a container having an opening at one end and having a latch lip adjacent to said opening, said cover comprising a plate, a handle secured to said plate having at least two grips, a releasing grip and a non-releasing grip, two latching means for securing said plate to said latch lip, said latching means being responsive to said releasing grip to enable removal of said cover, the appearance of said releasing grip and said non-releasing grip being substantially the same.

4,032,036

RETAINING CLIP

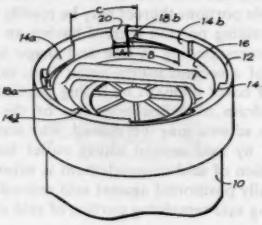
Junius Sycle, Jr., New Shrewsbury, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 1, 1976, Ser. No. 737,635
Int. Cl.² B65D 45/16
U.S. Cl. 220—324 **12 Claims**

1. Sealing means for a tubular casing having a plurality of cammed lugs equally spaced about the interior of a rim formed at the open end thereof, comprising, in combination:

a circular cover adapted to be inserted in the rim of the casing for locking therewith, said cover having equally spaced about the periphery thereof a plurality of cammed lugs for rotatably engaging the lugs of the casing when said cover is rotated in one direction; and

a U-shaped retaining clip having a pair of legs for compressively engaging the opposing surfaces of the casing rim between succeeding ones of the rim lugs and having a jutting portion on one leg for blocking the rotation of a selected one of said cover lugs in a direction opposite to said one direction thereby to retain said cover in locking engagement with the casing.

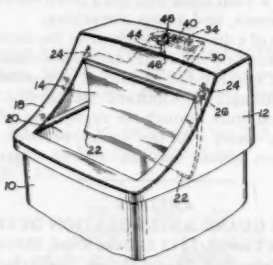


4,032,037

CLOSURE AND FASTENER FOR TRASH BINS

Roy Frederick Dubery, Hanworth, and Ronald Arther Chivrail, London, both of England, assignors to Airfix Plastics Limited, Hanworth, England

Filed Apr. 7, 1976, Ser. No. 674,403
Claims priority, application United Kingdom, Mar. 6, 1976, 09090/76.
Int. Cl.² B65D 43/24
U.S. Cl. 220—335 **4 Claims**



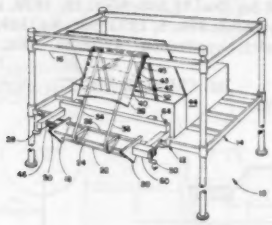
1. A bin comprising an aperture affording access to the bin interior, and a lid hinged to the bin for movement between an open position and a position closing said aperture, the lid being movable by gravity to closed position, wherein the improvement comprises a catch consisting of a magnet mounted on the bin, and a keeper carried in a pocket in the lid in a position to engage said magnet when the lid is in open position, the keeper being free to move in the pocket to a limited extent to enable it to conform to the opposing face of the magnet, and release means for disengaging the keeper from the magnet to allow the lid to close.

4,032,038

DEVICE, APPARATUS AND PROCESS FOR DISPENSING TAPED BAGS

David Allen Hendricks; Milton Albert Howe, Jr., both of Spartanburg; Stephen Royall Luck, Greenville, all of S.C.; Alfred Ray Morris, Cedar Rapids, Iowa, and Dave Leslie Owen, Wellford, S.C., assignors to W. R. Grace & Co., Duncan, S.C.

Filed Jan. 29, 1976, Ser. No. 653,420
Int. Cl.² B65H 19/12
U.S. Cl. 221—71 16 Claims



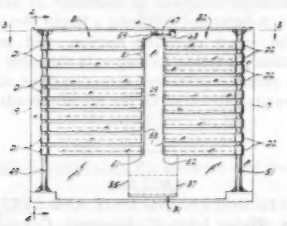
1. A device comprising
a. a first carrier,
b. means for rotatably mounting the carrier to permit rotation of the carrier about an axis of rotation,
c. means defining a surface adapted to rotate in response to rotation of the carrier to wind-up at least one flexible support,
d. means for permitting rotation of the surface in a first rotational direction and for substantially precluding rotation of the surface in a direction opposite to the first direction, and
e. a second carrier spaced from and opposite said first carrier, said surface-defining means extending from one of said carriers to the other of said carriers, and means for permitting relative displacement of at least one of said carriers away from said surface-defining means.

4,032,039

ARTICLE-DISPENSING APPARATUS

James T. Schuller, St. Louis County, Mo., assignor to UMC Industries, Inc., Stamford, Conn.

Filed Nov. 13, 1975, Ser. No. 631,531
Int. Cl.² G07F 11/36
U.S. Cl. 221—75 9 Claims



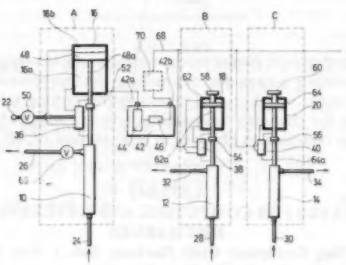
1. Article-dispensing apparatus comprising a cabinet, a first and a second bank of article dispensers in the cabinet, each bank comprising a plurality of dispensers located one above another, each dispenser being adapted to hold a series of articles to be dispensed in a row extending toward one end of the dispenser and having means for feeding the articles toward said one end of the dispenser and discharging the leading article of the series to drop by gravity, the first bank and the second bank of dispensers being arranged in the cabinet with the dispensers of the first bank feeding in one direction and the dispensers of the second bank feeding in the opposite direction and with the discharge ends of the dispensers of the first bank spaced from the discharge ends of the dispensers of the second bank providing a common vertical discharge chute between said banks, said cabinet having a delivery station to which an article delivered from any of the dispensers drops down in said chute, and a closure movable between a first position extending heightwise in said chute at the discharge ends of the dispensers of the first bank for closing off the first bank from the chute and a second position extending heightwise in the chute at the discharge ends of the dispensers of the second bank for closing off the second bank from the chute.

4,032,040

METHOD AND CONTROL SYSTEM FOR BATCHING PLURAL SUBSTANCES AND PUMP SYSTEM

Géza Kecskeméthy; Róbert Tihanyi, and György Virág, all of Budapest, Hungary, assignors to Muanyagipari Kutato Intezet, Budapest, Hungary

Filed Sept. 22, 1975, Ser. No. 615,661
Claims priority, application Hungary, Sept. 23, 1974, MU 529
Int. Cl.² B67D 5/08, 5/52
U.S. Cl. 222—1 8 Claims



1. In a method of batching at least two substances, more particularly synthetic resins and other materials such as catalysts and accelerants in preselected and adjustable amounts and proportions, each substance being delivered by individual batchers, the steps of driving said batchers by means of reciprocating pressure cylinders, selecting a first pressure cylinder for being supplied with a pressure medium from a source of such medium, feeding further pressure cylinders with a pressure medium dependent on the number of strokes per minute of said first pressure cylinder, controlling the total amount of discharge of the batchers by varying the number of strokes per minute of said first pressure cylinder, and controlling the mutual proportions of delivered substances by varying the stroke lengths of said further pressure cylinders.

4,032,041

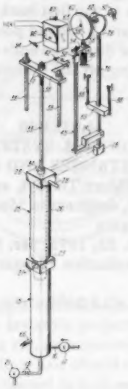
DISPENSING APPARATUS HAVING TEMPERATURE COMPENSATING FLUID METERING

Ralph E. Bruce, Dayton, Ohio, assignor to Production Control Units, Inc., Dayton, Ohio

Filed Aug. 11, 1975, Ser. No. 603,759
Int. Cl.² B67D 5/30
U.S. Cl. 222—14 18 Claims

13. In apparatus for metering and dispensing a fluid and adapted to charge a refrigeration system with a liquid refrigerant, said apparatus including a positive displacement pump having a movable fluid displacement member, means for moving said displacement member to effect dispensing of the fluid, and means for controlling the movement of said displacement member in response to changes in temperature of

the fluid, the improvement wherein said means for controlling the movement of said displacement member comprise a deformable control member having a plurality of elements successively arranged generally in a row, means including an electro-optical unit for counting said elements in response to



movement of said displacement member, means responsive to said counting means for controlling the movement of said displacement member, and means for deforming said control member for changing the spacing between adjacent said elements in response to changes in temperature of the fluid.

4,032,042

APPARATUS FOR COMPUTING AND METERING LIQUID DISCHARGES

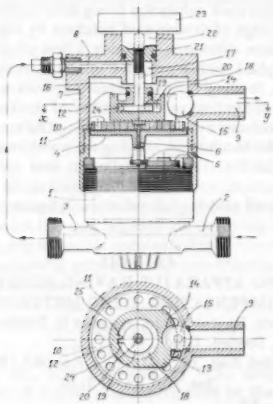
Moise Piat, Residences Clair Horizon, Bat. 1 Bloc A Avenue Joseph Giordan, 06000 Nice, France

Filed May 10, 1976, Ser. No. 684,894

Claims priority, application France, Oct. 2, 1975, 75.30740

Int. Cl.² B67D *5/30*

U.S. Cl. 222—20 **8 Claims**



1. A computing and metering device allowing only predetermined controllable quantities of a liquid to be discharged from a liquid outlet aperture, comprising a turbine flowmeter, metering means driven by said flowmeter and having a rotatable plate which carries a ball located in such a way as to block the arrival of the liquid when the said plate has moved through a given angle of revolution from a position predetermined by a setting component, the flowmeter and the metering means being disposed in separate chambers and being in communication with one another such that the whole of the flow passing through one said chamber then passes into the other chamber via an external duct.

4,032,043

DISPENSING CONTAINER NECK THREAD PROTECTION

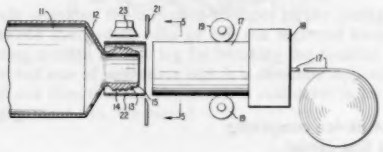
Dusan S. Lajovic, Smithfield, Australia, assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 75,840, Sept. 28, 1970, abandoned. This application Feb. 5, 1973, Ser. No. 329,399

Claims priority, application Australia, Oct. 2, 1969, 61800/69

Int. Cl.² B65D *35/08*

U.S. Cl. 222—92 **12 Claims**



1. A dispensing tube assembly containing a fluent substance containing abrasive material comprising a collapsible metal body formed integrally at one end with a stiff shoulder terminating in a relatively rigid reduced diameter hollow discharge nozzle having an externally threaded section, an internally threaded closure cap for mounting on said nozzle and means for protecting said metal neck threads against abrasion by the substance contained in the body as the cap is repeatedly removed and replaced during successive discharges of portions of said substance in use of the assembly comprising a thin-walled smooth surfaced covering consisting of an integral heat shrunk element of non-metallic synthetic plastic material tightly permanently mounted and anchored against axial displacement on said nozzle in close internal and external contour following conformance with said threaded section, said nozzle being formed intermediate the shoulder and said threaded section with an annular anchor section distinct from the threaded section, the inner end of said element surrounding said annular section in snug internal and external contour following conformance and thereby anchoring said element against axial displacement on said nozzle when said threaded closure cap is rotatably applied upon or removed from said nozzle threads, said covering of plastic material resulting in only an immaterial increase in diameter of said threaded nozzle section thereby not requiring a larger closure cap than did the initial metal threaded section, and said covered threaded section providing a composite threaded region having a smooth abrasion protected thread surface stabilized and directly internally supported by the metal threads of the nozzle.

4,032,044

LIQUID DISPENSING UNIT AND SYSTEM

Jac B. Flynn, Elgin; Jerry C. Janquart, Crystal Lake, and Werner K. Priese, Barrington, all of Ill., assignors to Hills-McCanna Company, Carpentersville, Ill.

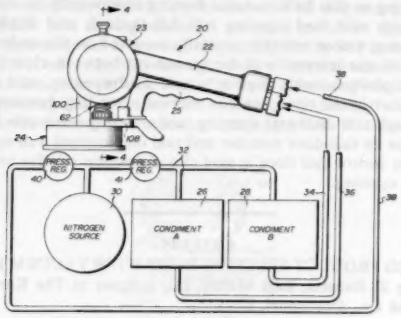
Filed Mar. 8, 1976, Ser. No. 664,556

Int. Cl.² G01F *11/08;* **B67D** *5/52*

U.S. Cl. 222—135 **32 Claims**

1. A dispensing unit for use in the controlled, metered dispensing of a liquid product, said unit adapted for use in a system wherein said product is supplied under pressure, said dispenser comprising: a body assembly, at least one metering chamber and discharge passage means provided in said body assembly, with a flexible diaphragm forming a wall of said

metering chamber, means for establishing a force on the side of said diaphragm opposite said metering chamber, and control means operable to effect supply of pressurized product to said metering chamber to create a pressure differential across said diaphragm in a direction which will overcome any force established on said oppoiste side, thereby permitting complete filling of said metering chamber with pressurized product said



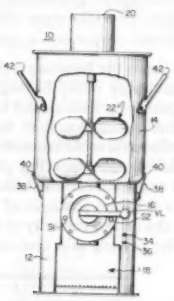
control means also being operable to produce blackage of pressurized product to said metering chamber while establishing communication between said metering chamber and said discharge passage means, such that a pressure differential across said diaphragm will then be created in the opposite direction forcing a predetermined volume of product out of said metering chamber.

4,032,045

SOUP DISPENSER

Richard R. Epple, Glen Burnie, Md., assignor to Maryland Cup Corporation, Owings Mills, Md.

Filed June 20, 1975, Ser. No. 588,903
Int. Cl.² B67D *5/62*; G01F *11/22*
U.S. Cl. 222—146 HE **17 Claims**



1. A dispensing apparatus for hot soup and the like comprising:

a base stand;

heating and control means housed in said base stand for supplying controlled heat;

a reservoir and integral dispensing valve assembly mounted on said base stand with the lower end of said reservoir in immediate proximity to said heating means;

said base stand having a generally cylindrical configuration interrupted by inwardly extending vertical walls defining a vertical dispensing chamber for receiving receptacles to be filled;

said dispensing chamber freely receiving said dispensing valve assembly;

said dispensing valve assembly including a discharge spout positioned in the upper portion of said dispensing chamber;

said reservoir having an open top;

split lid means closing said reservoir and comprising a major section and a minor section; and

motor driven rotary impeller means removably mounted in said major section of said split lid means;

said impeller means extending into close proximity with the bottom of said reservoir and imparting upward thrust to soup and solid particles entrained therein when said reservoir contains soup to be dispensed to preclude settling of solid particles in said reservoir; and

said minor section of said lid means being freely removable independently of said major portion to provide access to said reservoir without removing said impeller means;

wherein said base stand includes an internal shelf positioned adjacent the top thereof and the bottom of said reservoir; and

wherein said heating and control means comprises: at least one heating element mounted on said shelf,

biasing means mounting said heating element on said shelf and constraining said heating element into positive engagement with the bottom of said reservoir, and

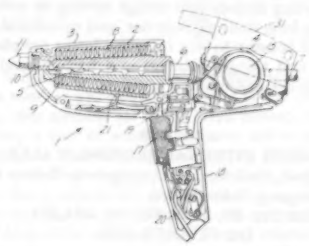
thermostat means for controlling said heating element and the temperature of said reservoir mounted adjacent the latter on said shelf and in close proximity to the bottom of said reservoir.

4,032,046

APPARATUS FOR FEEDING GLUE TO A HOT MELT GLUE DISPENSING APPLIANCE

Richard Montgomery Elliott; Albert Eugene Newton, both of Beverly, and John Sherburne Kelley, Wenham, all of Mass., assignors to USM Corporation, Boston, Mass.

Filed Nov. 1, 1976, Ser. No. 737,565
Int. Cl.² B67D *5/62*
U.S. Cl. 222—146 HE **7 Claims**



1. In an appliance having a heated melt chamber constructed within the appliance housing, the chamber adapted to receive a flexible rod of thermally activatable glue, to melt the rod of glue, and to intermittently dispense melted glue therefrom; apparatus to feed said flexible rod of glue to the melt chamber comprising:

A. a mounting frame secured within the appliance housing for sliding movement towards and away from the melt chamber, said movement being biased away from the melt chamber;

B. power driven means mounted on the frame to engage the rod of glue and urge it towards the melt chamber;

C. an actuating lever pivotally secured on the appliance housing and operatively connected to the mounting frame to move the frame towards the melt chamber and to feed the rod of glue into the chamber when the lever is operated, said frame and rod of glue being retracted upon release of the actuating lever; and

D. a switch operatively connected to the actuating lever and to the engaging means to energize said means upon operation of the actuating lever.

4,032,047

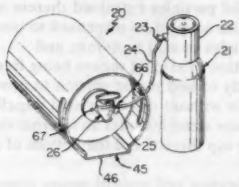
LIQUID DISPENSING CONTAINER CONSTRUCTION

Calvin L. Wilson, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

Continuation of Ser. No. 550,979, Feb. 19, 1975, abandoned. This application May 5, 1976, Ser. No. 683,411

Int. Cl.[2] B67D 5/64

U.S. Cl. 222—183 17 Claims



1. A dispensing container construction for a liquid under gaseous pressure comprising, a housing defining a product chamber for said liquid, said housing comprising a cylindrical central portion and a pair of outwardly convex end portions, a spigot device carried by one of said end portions for dispensing said liquid from within said chamber, a closeable filler device for said chamber provided in the other of said end portions, a protective sleeve disposed around said housing and said devices, said sleeve having opposed end edges each arranged outwardly of its associated device and each for supporting said container construction, said end edges defining the axial length of said sleeve therebetween and said sleeve having a uniform single thickness throughout its entire axial length, said sleeve having an identical peripheral outline at each cross section along said length, said sleeve being a tubular single piece sleeve having integral anti-roll means, said anti-roll means being a bottom trough provided as a portion of said single piece sleeve and extending the full length thereof, said trough having a bottom which has a substantially planar bottom supporting surface said trough serving to collect any liquid dripping from said spigot device, said cylindrical central portion of said housing having its entire lower periphery disposed within said trough adjacent said bottom, and means holding said sleeve and housing together.

4,032,048

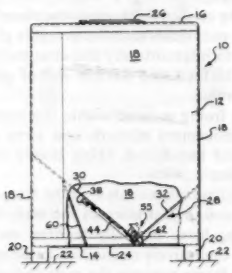
BIN WITH INTERNAL SLOPING WALLS

Dwight E. Nichols, Beatrice, Nebr., assignor to Hoover Ball and Bearing Company, Saline, Mich.

Filed Dec. 29, 1975, Ser. No. 644,591

Int. Cl.[2] B67D 5/06

U.S. Cl. 222—185 2 Claims



1. A bin for storing and transporting bulk material comprising a bin body having a generally horizontal bottom wall having a discharge opening formed therein, a top wall, side walls extending between said top and bottom walls, and body support legs on said bottom wall, an internal hopper assembly in said body below said top wall consisting of two inclined walls arranged in a generally V-formation for directing all bulk material in said body toward said discharge opening, each of said internal walls having the upper end thereof secured to one of said side walls at a position substantially above said bottom wall and having the lower end thereof located adjacent to and above said bottom wall, means in one of said internal walls forming a feed opening located directly above said discharge opening so that bulk material flowing downwardly in said bin through said feed opening will fall through said discharge opening, a door member pivotally mounted on the underside of said one internal wall for movement between closed and open positions with respect to said feed opening, said door member in the open position thereof extending downwardly through said discharge opening, and coacting releasable latch means on said door member and said one internal wall operable to secure said door in said closed position relative to said feed opening.

4,032,049

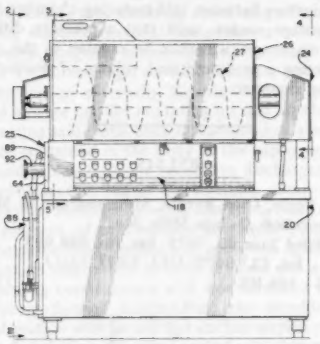
FOOD PRODUCT STUFFING PUMP WITH VACUUM LINE

Gary F. Roberts, East Moline, Ill., assignor to The Kartridg Pak Co., Davenport, Iowa

Filed Aug. 18, 1975, Ser. No. 605,609

Int. Cl.[2] A22C 11/08; G01F 11/20

U.S. Cl. 222—238 14 Claims



1. A stuffing pump for handling a food product comprising a helical gear metering pump having a single outlet passage and dual inlet passages, first means for driving said metering pump at variable speed; vacuum means connected to the metering pump to remove air from the food product, an elongated hopper above the metering pump for receiving food product, a feed conveyer in the bottom of the hopper feeding food product to the inlet passages of the metering pump at a rate faster than the intake capacity of said metering pump, and second means for driving said conveyer at variable speed.

4,032,050

MEASURING CLOSURE FOR CONTAINERS

Richard J. Funk, 344 N. Mulberry, Lancaster, Pa. 17603

Filed Feb. 19, 1976, Ser. No. 659,470

Int. Cl.[2] G01F 11/06

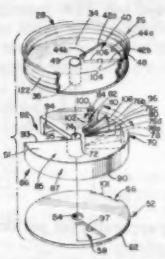
U.S. Cl. 222—284 1 Claim

1. A measuring and dispensing closure formed of plastic materials for a container or the like, comprising:

a container lid member attachable to the container for readily covering and uncovering the container, said lid having a center post extending outardly therefrom, a dispensing slot defined therein for dispensing material from the container, and screw threads for cooperating with screw threads on the container to selectively attach and detach said lid from the container;

a dispensing wedge rotatably attached to said center post

and having a plurality of walls, two of which walls define therebetween a material measuring chamber for receiving material from the container via said lid dispensing slot when said measuring chamber and said lid dispensing slot are aligned, a chamfered portion on one wall of said material measuring chamber adjacent said lid for passing said material thereover into said chamber, and two of which walls have attached thereto a sealing means which is essentially imperforate to seal said lid dispensing slot when said sealing means is oriented to cover said lid dispensing slot when said dispensing slot is not in use to effect an essentially air-tight seal of the container, and further ones of said walls in said measuring chamber dividing that chamber into thirds for dispensing a measured amount of material which is less than that amount



dispensed by a full chamber, and a housing on said dispending wedge having a floor and a skirt attached to said floor, said floor and said skirt contacting said lid, said floor having defined therein a slot and said dispensing wedge being attached to a hub having a cutout portion aligned with said slot for receiving said center post therein; and

an outer top member fixedly secured to said center post and having a measured dispensing slot defined therein and adjustment means thereon for adjusting the amount of material dispensed from said material chamber, said measured material dispensing slot being positioned to cooperate with said dispensing wedge material measuring chamber to dispense material from said chamber for ultimately dispensing a measured amount of material from the container.

4,032,051

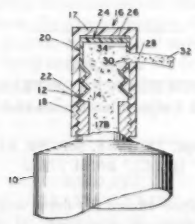
SELF SEALING CAP FOR A COLLAPSIBLE TUBE

James V. Testa, 31 Carlton Terrace, Bloomfield, N.J. 07003

Filed Dec. 23, 1975, Ser. No. 643,785

Int. Cl.² B65D *25/40*

U.S. Cl. 222—492 **2 Claims**



1. A dispensing cap for providing a flow of cream from a delivery opening in the neck of a collapsible tube, comprising:

a cylindrical shell open at a bottom end adapted for connection to said neck, said shell having a dispensing hole therethrough in a sidewall thereof;

a contractible and expandible bellows located wholly within the interior of said shell having an open end connected to the interior of said shell to receive a flow of cream from said bottom and into said open end, said bellows having a feed hole therethrough which is in alignment with said dispensing hole in said shell in response to a pressure being applied to said tube whereby said bellows is expanded and cream flows through said delivery opening, said feed hole and said dispensing hole,

said bellows including an axially movable sealing segment within the interior of said shell which covers said dispensing hole in response to said bellows being contracted upon cessation of pressure being applied to said tube.

4,032,052

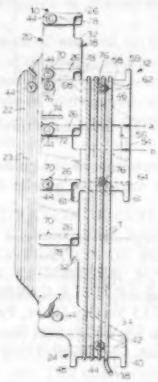
FRINGE AND TASSEL MAKER

Hamilton Canfield Bates, Jr., Chester, Conn., assignor to C. J. Bates & Son, Inc., Chester, Conn.

Filed Aug. 9, 1976, Ser. No. 712,486

Int. Cl.² A41H *43/00*

U.S. Cl. 223—46 **4 Claims**



1. A fringe and tassal maker comprising, a base member having a winding and cutting abutment at one end thereof and having a slide member releasably fixed thereto, the slide member having a pair of winding surfaces and a pair of cutting areas thereon, the winding and cutting abutment having a winding surface and a cutting area thereon, and the slide member being selectively positionable along and relative to the base member for providing different lengths of fringes and tassels obtained by winding yarn around selected ones of the winding surfaces and cutting the yarn at selected ones of the cutting areas.

4,032,053

ARTICLE CARRIER WITH HANDLE FEATURE

Jerry F. Wilson, Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Filed June 30, 1976, Ser. No. 701,274

Int. Cl.² A45C *11/24*

U.S. Cl. 224—45 AB **1 Claim**

1. An article carrier comprising

a bottom panel with two sides and two ends,

a side panel upstanding from each side of the bottom panel,

end panel means extending across the ends of the carrier for retaining the articles in the carrier,

a top panel extending between the side panels and having two ends, a scoreline connecting the top panel to a first one of the side panels, locking flap means connecting the top panel to a second one of the side panels,

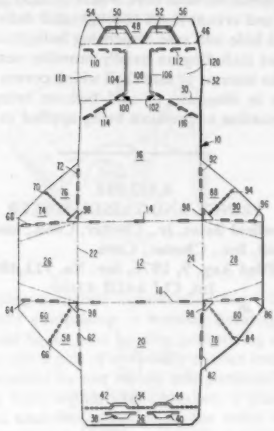
a pair of transverse handle die-cuts formed in the top panel,

a pair of rip guide die-cuts for each handle die-cut extending

from the respective handle die-cut to one of the ends of the carrier, and

a handle portion defined between the handle die-cuts,

a first one of each pair of rip guide die-cuts extending at a



diagonal angle so that it extends onto the first one of the side panels,

a second one of each pair of rip guide die-cuts extending straight from the respective handle die-cut to the end of the top panel.

4,032,054

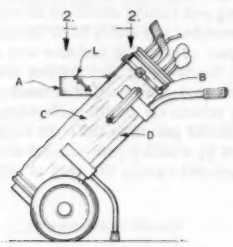
GOLF ARTICLE CARRIER

Norman E. Duncan, 713 Wesley Drive, Park Ridge, Ill. 60068

Filed Aug. 14, 1975, Ser. No. 604,594

Int. Cl.² B60R *11/00*

U.S. Cl. 224—29 B **7 Claims**



1. In an article carrier adapted to be detachably secured to a golf bag, the combination of:

a. a bottom wall, front and rear end walls, and opposed side walls interconnected to form a tray-like receptacle open at the top;

b. said rear wall sloping rearwardly and upwardly from said bottom wall at an angle of between 90° and 180°, so that when said carrier is attached to a golf bag which is disposed in an inclined position, said bottom wall will be disposed in a substantially horizontal position;

c. said rear wall including an upper portion extending a substantial distance above said side walls and including means for detachably securing said carrier to said golf bag;

d. a sloping transverse wall member extending between said side walls and projecting upwardly and inwardly from said rear end wall in spaced relation with said bottom wall.

4,032,055

FEED DEVICE FOR TAPE PERFORATORS

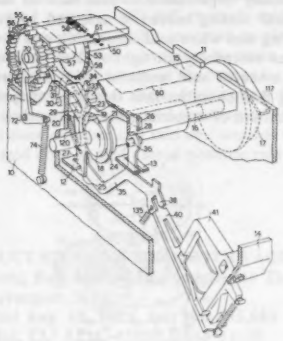
Armando Costa, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A. and Ufficio Brevetti, both of Turin, Italy

Filed Apr. 9, 1976, Ser. No. 675,368

Claims priority, application Italy, Apr. 18, 1975, 67985/75

Int. Cl.² B65H *17/40*

U.S. Cl. 226—76 **3 Claims**



1. A tape feeding apparatus for perforators or readers of a punched tape, comprising:

a frame;

a supporting shaft rotatably mounted to said frame;

a sprocket pulley mounted on said supporting shaft for rotation therewith for advancing the tape;

a first lever pivotally mounted to the frame and having a first and a second slot and a tab on one end thereof, said second slot disposed between said first slot and said one end;

a guiding element fixed to said frame and in cooperative engagement with said second slot;

a saw toothed pulley integral with said sprocket pulley and coactive with said first lever to be jogged by said tab;

spring means connecting said first lever to said frame, said spring means urging said tab into positive contact with a tooth of said saw toothed pulley; to effect the rotation of said saw toothed pulley; and

a circular cam rotatably mounted inside said first slot and acting positively in only one sense on said first lever in opposition to said spring means, to withdraw said tab from said saw toothed pulley and to impart to said one end movement along a substantially circular path, wherein in a first arc of said circular path said tab is moved away from a contacted tooth, in a second arc of said path, said tab is spaced away from the contacted tooth of said toothed pulley, and in a third arc of said path said tab returns towards the next tooth of said toothed pulley.

4,032,056

ROLL FEEDER DEVICE FOR PRESS WORKS

Sakumatsu Ito, 112 Daijoujijimonyama-cho, Kaga, Ichikawa, Japan

Filed Sept. 23, 1975, Ser. No. 616,014

Int. Cl.² B65H *17/22*

U.S. Cl. 226—154 **4 Claims**

1. A roller-type feed device for press works, comprising:

a roll feed mechanism having

a driving feed roll means,

a driven feed roll means,

gear means drivingly connecting the driving feed roll means to the driven feed roll means,

the driving feed roll means and the driven feed roll means being in spaced relation such that they will frictionally engage a material to be fed between them and feed the

same due to rotation of the driving and driven feed roll means;

a motion transmission mechanism having

a main drive shaft associated with and driven by a crank shaft in the press works,

a barrel cam mounted on the main drive shaft for rotation therewith,

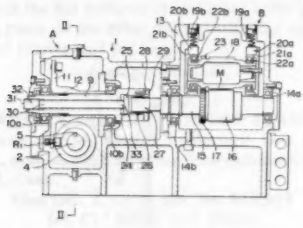
an index means mounted for rotation and in driven engagement with the barrel cam,

the barrel cam having at least one groove in the surface thereof a portion of which is a sine-curve groove such that will produce constant velocity rotation of the index means and another portion of which is a rectilinear groove such that will produce no rotational motion of the index means;

the driven feed roll means of the roll feed mechanism being in driven engagement with the index means whereby movement of the index means causes movement of the driving feed roll means so as to feed the material between the driving feed roll means and the driven feed roll means at predetermined intervals;

the driving feed roll means including:

a driving feed roll shaft mounted for axial rotation,



a driving feed roll mounted on the driving feed roll shaft for rotation therewith;

the driven feed roll means includes:

a driven feed roll mounted for axial rotation and for axial translation in a plane containing the axis of the driving feed roll shaft,

spring means biasing the driven feed roll towards the driving feed roll;

the gear means includes:

a driving gear secured to the driving feed roll shaft for rotation therewith,

a driven gear secured to the driven feed roll and in driven engagement with the driving gear;

the main drive shaft is connected to the press works drive shaft through an endless belt means;

the index means includes:

a circular index plate mounted for rotation about the central axis thereof,

a plurality of rollers mounted on one side of the index plate equidistant from the axis of rotation thereof and engageble with the grooves in the barrel cam;

the index plate being connected to the driving feed roll shaft so as to cause rotation thereof when the index plate is rotated by the barrel cam.

4,032,057

BRAZING CLIP

Phillip S. Linscott, Jr., Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Mar. 18, 1976, Ser. No. 667,931

Int. Cl.² B23K *1/04, 35/14*

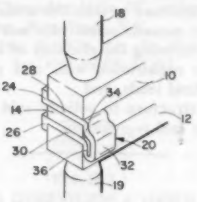
U.S. Cl. 228—56 **11 Claims**

1. A brazing clip for use in brazing two wires and a spacer element together wherein the brazing clip is maintained in a predetermined position between the wires and with respect to the spacer element during the brazing operation, wherein the brazing clip comprises:

a first leg suitable for inserting between a first wire and the spacer element;

a second leg suitable for insertion between a second wire and the spacer element;

a first retaining portion secured to one end of said first leg and configured to abut a first side of said first wire;



a second retaining portion secured to one end of said second leg and configured to abut a first side of said second wire; and

a connecting crosspiece secured to the other end of said first leg and the other end of said second leg wherein said crosspiece is configured with an end portion abuttable with a second side of said second wire effective to retain the brazing clip in the predetermined position during a brazing operation.

4,032,058

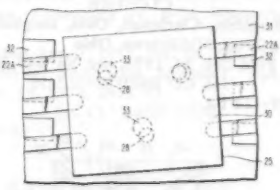
BEAM-LEAD INTEGRATED CIRCUIT STRUCTURE AND METHOD FOR MAKING THE SAME INCLUDING AUTOMATIC REGISTRATION OF BEAM-LEADS WITH CORRESPONDING DIELECTRIC SUBSTRATE LEADS

Jacob Riseman, Poughkeepsie, N.Y., assignor to IBM Corporation, Armonk, N.Y.

Division of Ser. No. 566,570, April 9, 1975, Pat. No. 3,997,963, which is a division of Ser. No. 375,296, June 29, 1973, Pat. No. 3,893,156. This application July 30, 1976, Ser. No. 710,054

Int. Cl.² H01L *21/60*

U.S. Cl. 228—180 A **8 Claims**



1. A method for automatically mounting a beam-lead integrated circuit chip on a dielectric substrate wherein said beam-lead chip comprises

a semiconductor chip substrate having a passivated planar surface from which the active and passive devices in the circuit extend into the substrate,

a plurality of peripheral beam-leads interconnected with the circuit devices extending beyond the periphery of the chip, and

a plurality of solder mounds having a lower melting point than said beam-leads extending from said surface to a plane further from said surface than the plane of said beam-leads, and

said dielectric substrate comprises

a metallic land pattern formed on a surface of said substrate,

a plurality of land leads extending from said conductive

land pattern on said substrate disposed so as to correspond with said plurality of beam-leads, and

a plurality of solder-wettable land pads on said non-wettable dielectric substrate disposed so as to correspond to said plurality of solder mounds,

which method comprises the steps of

placing the chip on the substrate so that said plurality of solder mounds are respectively in registration with said plurality of land pads,

heating the structure to melt the solder mounds whereby said solder mounds selectively wet the corresponding land pads to bring the plurality of beam-leads respectively into registration with said plurality of corresponding land leads, and

cooling the structure to solidify said solder mounds to thereby fix said registration.

4,032,059

METHOD USING A SOLDERING ALLOY FOR CONNECTING PARTS OF WHICH AT LEAST SOME ARE MADE OF ALUMINIUM

Alain Edouard Plegat, Asnieres, France, assignor to Societe Anonyme des Usines Chausson, Asnieres, France

Division of Ser. No. 566,991, April 11, 1975, Pat. No. 3,969,110. This application Mar. 26, 1976, Ser. No. 670,846

Claims priority, application France, Mar. 28, 1975, 75.13565

Int. Cl.² B23K *35/26*

U.S. Cl. 228—183 **4 Claims**

1. A method of soldering parts of which at least one is made of aluminum or aluminum alloy, comprising the steps of:

fluxing the parts to be connected together by means of an organic flux;

covering at least said fluxed portions with a soldering alloy comprising

65–85% lead by weight

12–30% cadmium by weight

1–6% antimony by weight

0.5–1% tin by weight;

heating said portions up to the liquidus temperature of the soldering alloy while holding said portions together; and cooling down to ambient temperature.

4,032,060

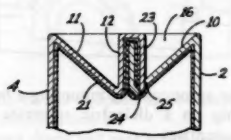
CARTON WITH SELF-SEALING RECLOSABLE END CLOSURE

Frank D. Bergstein, Cincinnati, Ohio, assignor to Bergstein Packaging Trust, Middletown, Ohio

Filed Dec. 24, 1975, Ser. No. 644,303

Int. Cl.² B65D *5/46, 5/56*

U.S. Cl. 229—14 BA **9 Claims**



1. In a rectangular carton having opposing side and end walls forming a carton body, a self-sealing reclosable end closure comprising a pair of opposing end closure flaps hingedly connected to the end edges of the carton side walls, said end closure flaps having a width somewhat greater than one-half the width of the carton end walls, a pair of mating sealing flaps hingedly connected to the outermost side edges of said pair of end closure flaps, a flap extension hingedly connected to the outer side edge of one of said sealing flaps, and a tubular liner in said carton body, the mouth of said liner projecting from said carton body to overlie said flap extension, the mouth of said liner having its opposite sides secured to said sealing flaps, said sealing flaps being juxtaposed in face-to-face parallel relation to the carton side walls with portions of the liner mouth sandwiched therebetween, said sealing flaps and the projecting end of the liner being jointly displaceable downwardly to lie within the confines of the carton body and with said opposing pair of closure flaps extending downwardly and inwardly within the carton to bias the sealing flaps and the portions of the liner mouth secured thereto into engagement with each other, said flap extension and the portion of the liner mouth overlying said flap extension being jointly foldable over the upper edge of the other of said sealing flaps, and attachment means for securing said flap extension in its folded position.

4,032,061

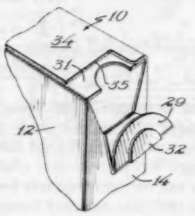
POUR SPOUT

Daniel P. Dutcher, Shoreview, and Edwin C. McLaren, Apple Valley, both of Minn., assignors to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed Apr. 12, 1976, Ser. No. 675,769

Int. Cl.² B65D *5/72*

U.S. Cl. 229—17 R **1 Claim**



1. A rectangular, tube like carton having bottom closure flaps and a top closure, said top closure including an improved reclosable pour spout, said closure and spout comprising:

an insertable tab hingedly attached to a first side wall panel of said carton and foldable inwardly along with a minor closure flap on the opposite side wall panel;

a section of said first side wall panel adjacent said insertable tab hingedly connected to said tab and having a pair of laterally spaced-apart frangible score lines connected along their bottom ends by a horizontal fold line to define a spout opening;

a first folded major flap contacting the top surface of said tab;

said first folded major flap having a removable section formed therein and defined by a frangible score line, said section in said flap positioned above and adhered to said tab; and

an outer major flap positioned above said first folded major flap and adhered thereto except in the area adjacent to said tab so that said tab and said removable section are insertable between the edges of said major flaps to reclose said spout opening.

4,032,062

BOX AND METHOD OF MAKING THE SAME

Minoro Kawai, and Kenji Muramatsu, both of Tokyo, Japan

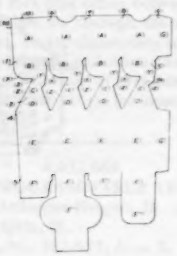
Filed Feb. 9, 1976, Ser. No. 656,737

Int. Cl.² B65D *5/38, 85/10*

U.S. Cl. 229—20 **7 Claims**

1. A polygonal box formed from a sheet of paperboard or the like, comprising a plurality of panels corresponding in number to the number of sides of said box, each of said panels comprising in combination an outer face, an outer cover portion, an inner cover portion, , a connecting piece, , an inner face and a bottom portion, said portions being con-

nected together in the order named, said outer cover portion being provided on a first side with a protruding lobe adapted to cooperate in overlapping relation with similar lobes on other outer cover portions, to form a closure for the top of said box, and on a second side opposite said first side with a tuck piece connecting said outer cover portion with said inner



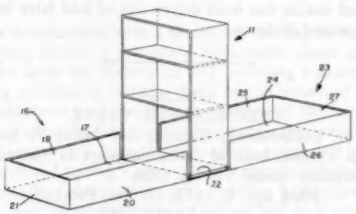
cover portion, said inner cover portion and said connecting piece being shaped to define a notched aperture effective to provide clearance between the edges of said tuck piece on the one hand and the flat surfaces of said inner cover portion and connecting piece on the other hand, during the operations of opening and closing said package.

4,032,063

RETURNABLE SHIPPING BOX FOR FURNITURE

Philip J. Davis, and M. Vincent Sanderford, both of Morganton, N.C., assignors to Champion International Corporation, Stamford, Conn.

Filed Oct. 2, 1975, Ser. No. 618,919
Int. Cl.² B65D *5/35, 85/00*
U.S. Cl. 229—23 C **4 Claims**



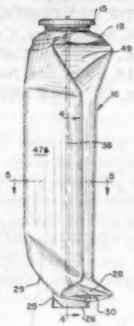
1. A returnable shipping box for furniture comprising:
a. a wooden planar base having a top and bottom surface and a pair of opposed side edges for supporting a piece of furniture on said top surface;
b. a first foldable portion comprising a plurality of base flaps attached to the bottom surface about said side edges of said base, and a front panel for engaging the front portion of a furniture piece, said front panel joined by side and top members which slidably engage the sides and top of the furniture piece when folded to form a closed box;
c. a second foldable portion including a plurality of base flaps attached to the bottom surface about said side edges of said base and a back panel for engaging the back portion of the furniture piece, said back panel joined by side and top members which slidably engage the sides and top of the first foldable portion when folded to form a closed box, the base laps of said first and second foldable portions defining a marginal area around said base when said base flaps are attached to said base, said marginal area including a portion of the base flaps of said first and second foldable portions overlying the opposed side edges of said base whereby said marginal area can be slit with the side edges of said base serving as a backing member for a slitting device so that said first and second portions can be pivoted relative to each other to an open position to expose the furniture piece within said box and can be repivoted to a closed position to reseal said box; and
d. plural tapes holding the first and second foldable portions in their closed positions.

4,032,064

BARRIER BAG ASSEMBLY FOR AEROSOL CONTAINER

Earl D. Giggard, Clarendon Hills, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Jan. 5, 1976, Ser. No. 646,458
Int. Cl.² B65D *33/02*
U.S. Cl. 229—55 **9 Claims**



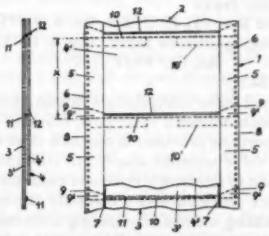
1. A plastic bag for an aerosol container comprising a generally cylindrical collapsible body and top and bottom end members, and means on said bottom member for resisting collapse of the bottom member upon the imposition of pressure on the body and bottom member, said body having portions adapted to fold in radially and the top end member of said bag being generally frusto conical and having an upper neck portion and gradually becoming thinner toward its juncture with the upper end of the body portion and being collapsible therewith inwardly.

4,032,065

FILE FOLDER WEB OF INDETERMINATE LENGTH

Egon Heimann, Falkenberg 61, D-56 Wuppertal-Elberfeld, Germany

Filed Apr. 1, 1975, Ser. No. 564,219
Claims priority, application Germany, Apr. 3, 1974, 2416247; Dec. 18, 1974, 2459741
Int. Cl.² B65D *27/10*
U.S. Cl. 229—69 **19 Claims**



1. A file folder web of indeterminate length formed of a series of interconnected individual file folders each having a length and a width, comprising in combination:
a. upper and lower sheets of indeterminate length arranged face-to-face and constituting, respectively, a front and a rear cover wall of each individual file folder;

b. main weakened lines provided in said sheets and extending along and through the length of each file folder;

c. a strip of adhesive extending between said sheets along the length of each file folder adjacent the main weakened line along one longitudinal edge of each file folder for bonding together said sheets; said strip of adhesive being the sole strip of adhesive in each individual file folder; and

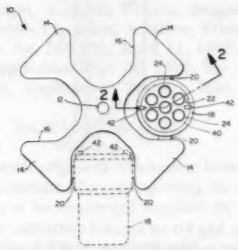
d. a fold line extending in one of said sheets parallel to and adjacent said main weakened lines; said strip of adhesive extending between the main weakened line along said longitudinal edge and said fold line.

4,032,066

ADAPTERS FOR CENTRIFUGE ROTORS

Herschel Eugene Wright, Santa Clara, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Mar. 15, 1976, Ser. No. 666,987
Int. Cl.² B04B 5/02
U.S. Cl. 233—26 **14 Claims**



1. An adapter assembly for use within a centrifuge rotor to convert a single cell receptacle within said rotor to a multi-cell receptacle for receipt of a plurality of sample carrying holders, said assembly comprising a plurality of adapter sections positioned adjacent to each other in a stacked relation within said single cell receptacle, each of said adapter sections having at least two holes for alignment with similar holes in adjacent adapter sections to form said multi-cell receptacle, said plurality of adapter sections being variable in number to provide adjustment to the desired depth of said adapter assembly within said rotor to establish substantially the same depth in said adapter assembly as the depth of any of a number of various sized sample carrying holders.

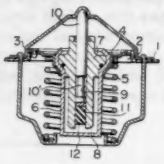
4,032,067

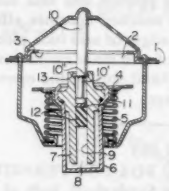
THERMOSTAT VALVE

Masanori Hanaoka, Toyota, and Masao Inagaki, Okazaki, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 11, 1975, Ser. No. 639,973
Claims priority, application Japan, Aug. 4, 1975, 50-107963
Int. Cl.² F01P 7/02
U.S. Cl. 236—34.5 **2 Claims**

1. A thermostat valve comprising a housing having a valve seat portion which defines a valve port, first and second supporting frame portions provided at opposite sides of said valve seat portion, a valve member adapted to cooperate with said valve seat portion to selectively open and close said valve port, a casing member provided with a centrally disposed cylindrical bore, said casing member containing a thermally expandable material therein, said centrally disposed cylindrical bore communicating with said thermally expandable material and carrying said valve member, a coil spring which elastically and slightly, tiltably supports said casing member against said first supporting frame portion in a manner so that said valve member carried by said casing member is elastically engageable onto said valve seat portion, and a needle member having one end portion thereof disposed in said bore so as to be slideable therealong and adapted to be driven out of said bore by said thermally expandable material in accordance with the thermal expansion thereof, the other end portion of said needle being pivotably supported by said second supporting frame portion in a manner so that said valve member carried by said casing member is adapted to be moved away from said valve seat portion under the reaction applied by said needle member





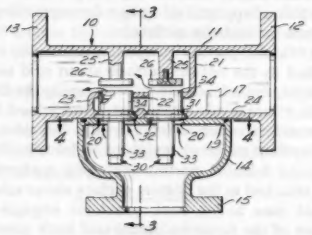
driven out of said bore due to the thermal expansion of said thermally expandable material, wherein a shoulder portion is formed in a part of said needle member disposed in said bore by reducing a part of said needle member, said shoulder portion being adapted to engage with an outer edge of said bore when said needle has been driven out of said bore beyond a predetermined distance.

4,032,068

THERMOSTATIC VALVE

Russell O. Luchtenberg, Hebron, and James P. Buchwald, Mount Vernon, both of Ohio, assignors to Thermo Valve Corporation, Mount Vernon, Ohio

Filed Apr. 8, 1975, Ser. No. 566,101
Int. Cl.² F01P 7/02
U.S. Cl. 236—34.5 **10 Claims**



1. In a thermostatic valve utilizing stock temperature-responsive valve element means comprised of a stem, a ring seat carried by the stem, and a skirted hollow head movable by a temperature-responsive element from a closed position on said ring seat to an open position, a main valve body provided with alternate outlet openings, a partition within said main valve body separating a first cavity within said body which leads to one outlet opening from a second cavity which leads to an alternate outlet opening, openings in said valve body and said partition to receive the skirted head of the stock valve

element means, means for removably holding said valve element means in said main body, spaced means to close said skirted head when it is moved axially from the ring seat, and inlet nozzle means for directing fluid to said valve elements, the stem of said valve element being offset from the axis of said inlet nozzle means, whereby fluid entering said inlet means is diverted to the offset stem of said valve element means and said fluid may pass either between said ring seat to one of said body outlets, or through the skirted head to an alternate body outlet, or simultaneously to both outlets, depending upon the position of said skirted head, and means for disconnecting at least a portion of said inlet means from said main valve body to provide access for inspection of said valve element means.

4,032,069

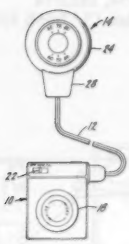
DAY-NIGHT PROGRAMMABLE THERMOSTAT

Joseph L. Cannella, Arlington Heights, Ill., assignor to Candel, Inc., Arlington Heights, Ill.

Continuation of Ser. No. 582,627, June 2, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,440

Int. Cl.² G05D *23/30*

U.S. Cl. 236—46 R **1 Claim**



1. The combination with a thermostat having air temperature sensing means, a one-piece replaceable cover member positioned upon the thermostat and including a downwardly extending portion, a resistive heat source attached to and within said downwardly extending portion of the cover and positioned adjacent said temperature sensing means, a timer physically separated from the thermostat, cover and resistive heat source and having a power cord extending therefrom to be electrically connected to said resistive heat source and having a pair of terminals to be connected to a source of electric power, a transformer within said timer and electrically connected between said timer and resistive heat source for reducing the voltage from the source of power applied to said resistive heat source, a switch at said timer for controlling the application of power to said resistive heat source, and a resistor connected in parallel with said resistive heat source and physically located at said timer, said timer controlling the application of power to said resistive heat source which in turn affects the temperature of air immediately adjacent said thermostat temperature sensing means to control operation of said thermostat.

4,032,070

THERMOSTATIC EXPANSION VALVE FOR REFRIGERATION INSTALLATIONS

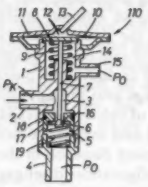
Leif Nielsen, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 495,384, Aug. 7, 1974, abandoned. This application Sept. 2, 1975, Ser. No. 609,608

Int. Cl.² F25B *41/04*

U.S. Cl. 236—92 B **1 Claim**

1. A thermostatic expansion valve assembly for a refrigeration installation of the type having condenser and evaporator units, comprising, a housing, a condenser inlet port and an evaporator outlet port in said housing, an operating unit having a chamber pressure responsive to the superheat temperature of said evaporator unit, valve means between said ports including a piston and a cylinder with said piston being reciprocally mounted in said cylinder, a central opening in said piston forming a movable valve seat carried by said piston, said operating unit including a centrally disposed rod extending through said piston opening, said valve means including a closure member attached to the lower end of said rod which is cooperable with said valve seat, spring means biasing said



piston in an upstream valve opening direction, said piston pressure biasable by condenser pressure in a downstream valve closing direction, said operating unit being operable to move said rod and closure member thereof in a valve opening direction, said spring means having a characteristic curve relative to a range of values of said condenser pressure to maintain a flow quantity through said valve means over said range of condenser pressure values which corresponds only to said operating unit chamber pressure.

4,032,071

THERMALLY RESPONSIVE VALVE HAVING DUAL OPERATING TEMPERATURES

Kazuo Imoto, Yokohama, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 10, 1976, Ser. No. 684,805

Claims priority, application Japan, Dec. 29, 1975, 50-159783

Int. Cl.² G05D *23/08*

U.S. Cl. 236—101 E **11 Claims**

1. A valve responsive to unidirectional temperature change through two temperature levels for moving, as the valve passes through said respective temperature levels, from a first operating condition to a second operating condition and then from said second operating condition to said first operating condition, said valve comprising valve body means defining an internal operating space, a pair of valve openings, and passages extending from said openings into said operating space providing communication between said openings through said operating space, a first dish-shaped bimetal element disposed in said operating space to be movable with snap-action from an original dished configuration to an inverted dished configuration in response to a change in temperature through a first selected temperature level, a second dish-shaped bimetal element disposed in said operating space to be movable with snap-action from an original dished configuration to an inverted dished configuration in response to a change in temperature through a second relatively higher temperature level, and a pair of valve seat means disposed between the operating space and respective passages to be engaged and disengaged by respective bimetal elements for closing and opening passages when said elements move between said element configurations, said passages being arranged relative to the engagement and disengagement of said elements with said valve seat means to establish a first valve operating condition at a valve

temperature below said first temperature level, to establish a second valve operating condition at a valve temperature between said first and second temperature levels and to establish said first valve operating condition at a valve temperature above said second temperature level.

7. A valve responsive to unidirectional temperature change through two temperature levels for moving, as the valve passes through said respective temperature levels, from an open-valve operating condition to a closed-valve operating condition and then from said closed-valve operating condition to an open-valve operating condition, said valve comprising valve body means defining an internal operating space, two openings extending into the body means, a pair of first passages extending from one of said openings into opposite sides of said operating space, and an additional passage extending from the other of said openings into the operating space between said first passages, a pair of valve seat means disposed between said operating space and said respective first passages, a first dish-shaped bimetal element disposed in the operating space in an original dished configuration disengaging one of said valve seat means for permitting communication between said openings over said one valve seat means, said first element being movable with snap-action to an inverted dished configuration when heated through a first temperature level to engage said one valve seat means for preventing communication between said openings over said one valve seat means, and a second dish-shaped bimetal element disposed in the operating space in an original dished configuration disengaging the other of said valve seat means for permitting communication between said openings over said other valve seat means, said second element being movable with snap-action to an inverted dished configuration when heated through a second relatively higher temperature level to engage said other valve seat means for preventing communication between said openings over said other valve seat means.

4,032,072

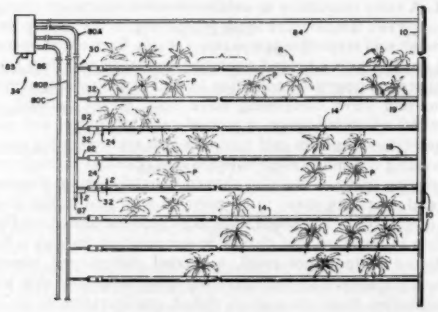
SOIL IRRIGATION METHODS AND APPARATUS

Bruce A. McElhoe, Waialua, and Joseph G. Tabrah, Kahuku, both of Hawaii, assignors to Hawaiian Sugar Planters' Association, Honolulu, Hawaii

Division of Ser. No. 586,213, June 12, 1975, which is a division of Ser. No. 522,912, Nov. 11, 1974, Pat. No. 3,921,905. This application Sept. 8, 1976, Ser. No. 721,558

Int. Cl.² B05B *17/04*

U.S. Cl. 239—11 **2 Claims**



1. A method of irrigating soil comprising the steps of:

deploying a plurality of drip tubes along plant rows, each drip tube having a flushing valve located on one end thereof, said flushing valve including a primary inlet communicating with said drip tube and a pilot opening;

communicating the other end of each drip tube with a supply of pressurized liquid;

producing a substantially continuous trickle of liquid to the soil through drip orifices contained in said drip tubes by the step of:

diverting a portion of said pressurized liquid simultaneously to said pilot openings of said flushing valves in a manner shifting a valve element in each of said flushing valves to a sealing posture so as to prevent the discharge of liquid from said remote ends of said drip tubes; and

periodically flushing said drip tubes to removed solid material therefrom by the step of:

simultaneously relieving the pressure imposed on said valve elements by said diverted liquid to cause said valve element to be shifted to an open posture by pressurized liquid in said drip tubes in a manner allowing said pressurized liquid to be flushed from said remote ends of said drip tubes.

4,032,073

APPARATUS INCLUDING A PUMP MIXER FOR COATING OBJECTS

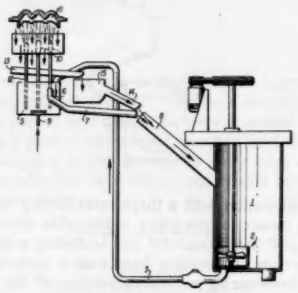
Ragnar Jakob Aaltonen, Norrgardsgatan 25, Hanko, Finland (10940)

Filed June 10, 1975, Ser. No. 585,651

Claims priority, application Finland, June 13, 1974, 1812/74; June 13, 1974, 1813/74

Int. Cl.² B05B *9/00*

U.S. Cl. 239—142 **14 Claims**



1. Apparatus for coating objects with a coating material, such as lime, comprising a mixing tank for containing the coating material, an intermediate tank connected to said mixing tank, means for feeding the coating material from said mixing tank to said intermediate tank and means for spraying the coating material fed to said intermediate tank on the subject to be coated, said feed means including an impeller positioned in said mixing tank, a tunnel member at least partly encircling said impeller and having upper and lower ends, closure means for partly closing the lower end of said tunnel member and a feed pipe extending from the lower, partly closed end of said tunnel member to said intermediate tank.

4,032,074

MATERIAL SPREADER

James Dalton Amerine, Marysville, Ohio, assignor to O. M. Scott & Sons Company, Marysville, Ohio

Filed Nov. 24, 1975, Ser. No. 634,906

Int. Cl.² A01C *17/00*

U.S. Cl. 239—685 **7 Claims**

1. In a spreader for particulate material adapted for advance along a given direction having means for discharging said particulate material downwardly from said spreader and means in association with said discharge means for broadcasting said discharged material in a generally radial path surrounding the axis of discharge, the improvement comprising

deflection means surrounding said broadcast means tapering downwardly and outwardly, the width of said deflec-

tion means along the direction of advance being less than the width along a direction transverse thereto, said deflection means being curved with its radius of curvature being smaller at the transverse end portions thereof, said deflection means aligned to intersect the path of said

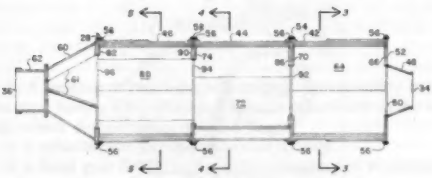
broadcast material and deflect the material downwardly to form a series of patterns of controlled configuration as the spreader is advanced, the density of said pattern being substantially uniform along the major portion thereof, the density along the transverse edges thereof being less than the major portion.

4,032,075

MULTI-CHAMBERED SCRUBBER HAVING POLYGONAL CROSS-SECTION

Clarence C. Tyer, Sr., 6100 Winding Way, Carmichael, Calif. 95608

Filed Aug. 16, 1976, Ser. No. 714,532
Int. Cl.² B02C *17/06*
U.S. Cl. 241—45 **18 Claims**



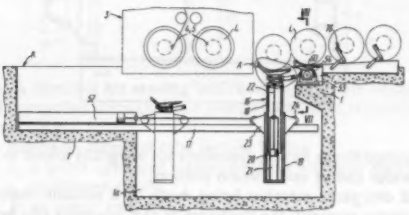
1. A multi-chambered scrubber apparatus comprising:
a frame;
a drive means; and;
a scrubber drum supported by said frame and adapted to be rotated by said drive means, said scrubber drum having a material input port and an output port and including between said input and output ports at least a first and second scrubber section each having a first and a second interior polygonal scrubber chamber, said first and second polygonal scrubber chambers including a first retainer ring therebetween having an opening therein smaller in area than the cross-sectional area of said first polygonal scrubber chamber.

4,032,076

APPARATUS FOR CONTINUOUS WINDING OF FILAMENT ON SPOOLS

Aizik Markovich Kogos, ulitsa F.Poletaeva, 24, korpus 2, kv. 50, Moscow; Flegont Andreevich Kolchanov, prospekt Lenina, 14, kv. 14, Balashikha-1 Moskovskoi oblasti; Adolf Alexeevich Gnedov, ulitsa Lukhovitskaya, 3, kv. 5, Moscow; Valery Alexandrovich Vinogradov, Ryazansky prospekt, 91, kv. 77, Moscow; Mark Abramovich Labkovsky, Novogireevskoe shosse, 16, kv. 16, Moscow; Sergei Alexandrovich Filatov, Zeleny prospekt, 23/43, kv. 54, Moscow; Vladimir Mikhailovich Kolesov, ulitsa Kirova, 89, kv. 10, Alma-Ata; Oleg Kirillovich Khrapchenkov, ulitsa Butyrskaya, 3, kv. 45, Moscow, and Alexandr Nikolaevich Semes, Kvartal 20, 89, kv. 10, Shelikhov Irkutskoi oblasti, all of U.S.S.R.

Filed June 28, 1976, Ser. No. 700,140
Int. Cl.² B65H *67/04*
U.S. Cl. 242—25 A **11 Claims**



1. An apparatus for continuous winding of filament on spools comprising: a winder means; pairs of centers each consisting of a movable center and a fixed center for parrallel arrangement of spools, said pairs of centers being incorporated in said winder means; a traversing mechanism of said winder means; a mechanism of said winder means for transferring filament from one spool to another; a device for feeding spools to and removing them from the centers, said device being in a force transmitting connection with said winder means; a carriage of said device for feeding spools to and removing them from the centers, said carriage having a top part and a bottom part; guides, said bottom part of the carriage being mounted in the guides, the guides extending under and normally to the centers; the bottom part of said carriage being made vertically split; the top part of said carriage consisting of three superposed plates of which a first plate is mounted on the bottom part of said carriage, an intermediate plate is articulated with a side thereof to the first plate for rotation in a vertical plane extending parallel with said guides of the carriage and supports guide members extending parallel with the pivot of the articulation for mounting a third plate which is used for accommodating the spools and is in a force transmitting connection with one of the movable centers when the part of the carriage is in the uppermost position; means for locking the position of the third, top plate of the carriage relative to the intermediate plate thereof; a feeding platform for feeding an empty spool to said carriage; a receiving platform for receiving a loaded spool from said carriage.

4,032,077

COLLAPSIBLE SPINDLE ASSEMBLY FOR TOILET TISSUE ROLLS AND THE LIKE

Daniel S. Baselice, 639 Redman Ave., Haddonfield, N.J. 08033

Filed Aug. 20, 1976, Ser. No. 716,083
Int. Cl.² B65H *19/00*
U.S. Cl. 242—55.2 **8 Claims**

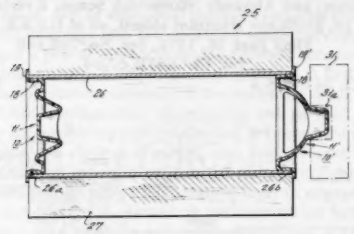
1. Mounting means for toilet tissue rolls and the like, said rolls being typically comprised of a hollow cylindrical-shaped core having an elongated toilet tissue sheet of indeterminate length wound therearound, said mounting means being a pair of members each comprised of:

a single thin light-weight one-piece member comprised of a rim portion and a trunion portion;

said rim portion having an outwardly-directed flange integrally joined at one end thereof and having an inwardly-directed continuous flange integrally joined at the opposite end thereof;

said trunion portion being comprised of a hollow truncated conical-shaped shell, the narrow end thereof being remote from said rim portion, and the wider end thereof being closer to said rim portion;

at least first and second spanning ribs, each of said ribs having a first end integrally joined to said inwardly directed flange having opposite ends integrally joined to the wider end of said trunion portion;



said one-piece member being made of a suitable resilient plastic material, the thickness of said spanning ribs being selected so as to enable the spanning ribs to bend in other to permit the trunion portion to collapse towards said rim portion and being further adapted due to the inherent resilience of the material to enable, by virtue of the plastic memory of the material, to assume its natural condition, whereby the trunion portion is moved away from the rim portion as the spanning ribs assume their natural unbent condition.

4,032,078

REEL FOR THE STORAGE OF WIRE OR THE LIKE

Guido Van de Loock, Hemiksem, Belgium, assignor to S. A. Bekaert-Cockerill, N.V., Hemiskem, Belgium

Filed May 13, 1976, Ser. No. 686,007

Claims priority, application United Kingdom, May 20, 1975, 21682/75

Int. Cl.² B65H *75/20*

U.S. Cl. 242—77.2 **7 Claims**

1. A reel for the storage of wire or the like which comprises a number of elements each made of a single piece of metal wire bent to form a segment of the heel and all joined together in a circular array, each of said elements being formed to provide two mutually opposite portions of respective rims of the reel, each of said rim portions having a side member extending radially inwardly from each of its ends, and a transverse member extending between each opposed pair of said side members, at least one of such transverse members constituting a bearing member of a ring of bearing members for the wire to be wound on the reel, the elements being spot-welded together.

4,032,079

FISHTAPE HOLDER

Robert W. Weeks, 12233 Ashworth North, Seattle, Wash. 98133

Filed Aug. 20, 1975, Ser. No. 597,650

Int. Cl.² B65H *75/36, 75/40*

U.S. Cl. 242—85.1 **6 Claims**

1. A fishtape holder, comprising:

a section of tubing defining a segment of an annular ring, said tubing having a sufficiently large diameter to permit a length of fishtape to be looped therethrough at least several times; and

guide means attached to said section of tubing, said guide means having an opening therethrough for receiving the fishtape, said guide means functioning as a guide for the removal or retrieval of the fishtape relative to said fishtape holder, one end of the fishtape being initially inserted through said guide means, looped through said tubing, and then secured to a point along the length of the fishtape to form a single fishtape coil of selected diameter, said fishtape holder being held stationary in operation so that the single fishtape coil rotates continuously through said section of tubing as the remainder of the fishtape is pulled away from or retrieved onto said fishtape holder.

4,032,080

LOCKING DEVICE FOR A SAFETY BELT OF WINDING-UP TYPE INTENDED FOR VEHICLES

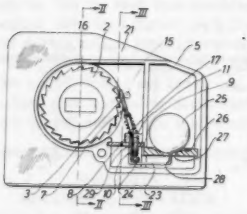
Stig Martin Lindblad, Urbanisation Albir 1, Cyndad de Elda, Casa 36, Alfas del Pi (Alicante), Spain

Filed July 7, 1975, Ser. No. 593,728

Claims priority, application Sweden, July 8, 1974, 74089327

Int. Cl.² A62B *35/00;* **B65H** *75/48*

U.S. Cl. 242—107.4 A **2 Claims**



1. Locking device for a safety belt of the winding-up type for vehicles having a rotatable shaft, means for attaching the safety belt to the shaft, and a spring biased said shaft to rotate in one direction, against which bias said belt can be unwound, said device comprising a ratchet wheel connected to said shaft to rotate therewith, pawl means pivotable around a pivoting axis between a releasing position disengaged from the ratchet wheel and a locking position engaging the ratchet wheel in order to impede the rotation thereof, said pawl means including a pivotable member and spring means having one end connected to said pivotable member at a distance from said

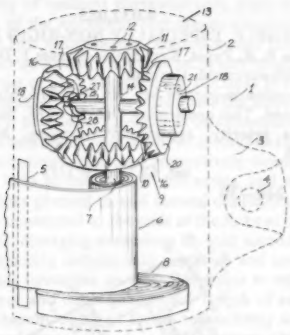
pivoting axis to bias same, a fixed support, the other end of said spring means carried by said fixed support, a movable element having an actuating portion operably associated with an intermediate portion of said spring means adapted to displace said intermediate portion of said spring means, giving same a different bending condition, and an acceleration sensing inertia body movable between a resting position and an activated position, said activated position being taken under the influence of acceleration forces exceeding a predetemined value, said movable element having a sensing portion sensing the position of said inertia body, said inertia body in one of its positions biasing the movable element via its sensing portion to a first position, said spring means by means of its intermediate portion biasing said movable element via its actuating portion to a second position, and said intermediate portion of the spring means being moved between a first and a second position, corresponding to the two positions of the inertia body, whereby the motion between the two positions of the intermediate portion of said spring means results in that the direction of the spring means bias force acting on said pivotable member of the pawl means passes from one side to the other side of said pivoting axis, thereby changing the direction of the torque acting on said pivotable member, to bias the pawl means to move alternatively into said releasing and into said locking position.

4,032,081

LOCKING DEVICE FOR SAFETY BELT

Thomas Joseph Murnane, 2, Maymount, Friar's Walk, Cork, County Cork, Ireland

Filed June 16, 1976, Ser. No. 696,807
Claims priority, application Ireland, June 16, 1975, 1351/75
Int. Cl.[2] A62B *35/02*; B75H *75/48*
U.S. Cl. 242—107.4 B **7 Claims**



1. A locking device for a self-coiling vehicle safety belt, of the type having a mounted coil spindle attachable to the vehicle, which device comprises

a. a spindle gear keyed to the coil spindle;

b. a fixed gear on the coil spindle mounting or an extension thereof;

c. at least one planetary gear adapted to mesh with the fixed gear and with the spindle gear;

d. portions of the planetary gear defining a toothless segment thereof, the toothless segment determining a resting rotary attitude of the planetary gear out of engagement with the fixed gear only;

e. means for biasing the planetary gear into the resting rotary attitude against all torques below a predetermined threshold magnitude; and

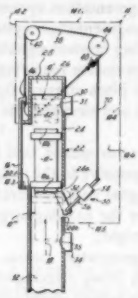
f. stop means for locking the planetary gear against rotation in excess of a predetermined angle of rotation from the resting rotary attitude thereof, in the direction corresponding to withdrawal of the safety belt.

4,032,082

COMBINED TRANSMIT AND RECEIVE PNEUMATIC CARRIER TERMINAL WITH MECHANICAL CARRIER CATCH

Adam Weissmuller, 27 Dale Ave., Pompton Plains, N.J. 07444

Filed Nov. 3, 1975, Ser. No. 628,111
Int. Cl.[2] B65G *51/32*
U.S. Cl. 243—19 **13 Claims**



1. A terminal for sending and receiving carriers pneumatically propelled through a combined system send/receive tube, comprising:

a stationary terminal tube section having

a. a lower open end communicating with said combined send/receive tube,

b. an upper end, and

c. a carrier insertion and removal opening intermediate said ends normally closed by a door,

a carrier catch pivotally mounted for movement between

a. an inner position projecting into said terminal tube section for supporting the lower end of a received carrier, and

b. an outer position permitting unobstructed bidirectional passage of a carrier between said combined send-/receive tube and said terminal tube section,

first means interconnected between said catch and door for biasing said catch to said inner position when said door is closed for supporting a received carrier in said terminal tube section while permitting momentary movement of said catch to said outer position during receipt of a carrier in the course of momentary movement thereof past said catch, and second means for biasing said catch to said outer position when said door is open allowing unobstructed insertion of a carrier into said terminal tube section for transmission via said tube, said combined send/receive second means being insufficient to bias said catch to said outer position when said door is open if a carrier is supported by said catch.

4,032,083

AUTOMATIC GAIN CONTROL FOR STABILITY AUGMENTATION SYSTEMS

Joseph R. Maciolek, Newtown, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 12, 1976, Ser. No. 675,707
Int. Cl.[2] B64C *11/44*
U.S. Cl. 244—17.13 **15 Claims**

1. A method for varying the operation of a stability augmentation system of an aircraft comprising the steps of:

calculating the position of a first control member as a function of a presumed gross weight and the actual value of a first aircraft dynamic parameter;

calculating the position of a second control member as a function of a preselected center of gravity condition and the actual value of said first aircraft dynamic parameter;

detecting the actual positions of the first and second control members;

comparing the actual and calculated positions of the first control member to determine whether actual gross weight has varied from the presumed value;

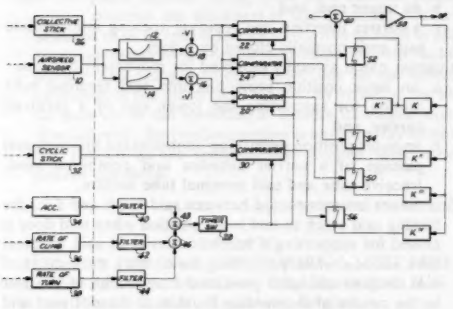
comparing the actual and calculated positions of the second control member to determine whether the actual center of gravity has deviated from the preselected position; and

adjusting the effect of the stability augmentation system on aircraft operation whenever the actual gross weight exceeds the presumed value or the actual center of gravity has deviated from the preselected position.

5. In a stability augmentation system for a rotary wing aircraft, the stability augmentation system including a power amplifier for enhancing control signals delivered thereto, the stability augmentation system receiving input signals commensurate with collective pitch control stick position, cyclic pitch control stick position and airspeed, the improvement comprising:

first function generator means, said first function generator means being responsive to the airspeed signal for generating an output signal commensurate with collective pitch stick position for the existing airpseed and a preselected aircraft gross weight;

second function generator means, said second function generator means being responsive to the airspeed signal for generating an output signal commensurate with cyclic pitch stick position for the existing airspeed and neutral aircraft center of gravity;



first comparator means, said first comparator means receiving the collective pitch stick position signal from said first function generator and the actual collective pitch stick position signal, said first comparator means providing an output signal when the actual collective pitch stick position varies in a first direction from the position corresponding to the output signal of said first function generator, said first comparator means output signal being indicative of actual gross weight exceeding the preselected gross weight;

second comparator means, said second comparator means receiving the cyclic pitch stick position signal from said first function generator means and the actual cyclic pitch stick position signal, said second comparator means providing an output signal when said actual cyclic pitch stick position varies from the cyclic pitch position corresponding to the output signal of said second function generator means, the output signal of said comparator means being indicative of a deviation of aircraft center of gravity from the neutral position; and

means for varying the gain of the stability augmentation system power amplifier in response to an output signal from either of said first or second comparator means.

4,032,084

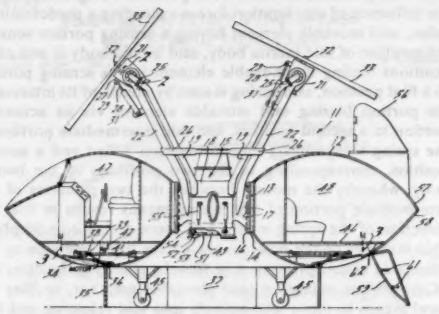
HELICOPTER TYPE AIRCRAFT WITH GROUND EFFECT STRUCTURE

John O. Black, 18094 Parkside, Detroit, Mich. 48221

Filed Mar. 11, 1976, Ser. No. 666,080

Int. Cl.² B64C 27/08

U.S. Cl. 244—17.23 7 Claims



1. In a doughnut-shaped aircraft, an aircraft body, a jet engine extending in a vertical direction supported by the center of said body, said jet engine having a combustion chamber from which gas is expelled downwardly at the exhaust end, conduit means extending upwardly from opposite sides of said chamber, a pair of gas turbines supported by the upper ends of said conduit means in a manner to be driven by the gas from said chamber, a propeller supported and driven by each said turbine, and means for adjusting the position of said turbines for changing the direction of flow of air produced by said propellers.

4,032,085

DIRIGIBLE, ESPECIALLY NON-RIGID DIRIGIBLE

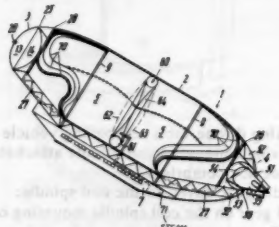
Hermann E. R. Papst, Karl-Maier-Strasse 1, D-7742 St. Georgen, Schwarzwald, Germany

Continuation-in-part of Ser. No. 452,675, March 19, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,193

Claims priority, application Germany, Mar. 21, 1973, 2313919

Int. Cl.² B64B 1/58

U.S. Cl. 244—30 12 Claims



1. A non-rigid dirigible comprising:

a non-rigid inflatable body member having a bow section and a stern section;

partition means secured to the body member so as to define gas cells in each section which can be pressurized to a higher pressure than the maximum dynamic pressure produced at the bow and the stern sections under flight conditions, the exterior of the body member being inherently subjected under flight conditions to a pressure zone at the bow and the stern portions and to a suction zone intermediate the pressure zones with a pressure transition

zone between each pressure zone and the suction zone, the partition means being disposed at each pressure transition zone, at least one of the partition means further comprising an annular tubular ring member engaging the inner wall of the body member and bulkhead means adapted to be loaded by tension and in engagement with the ring member.

4,032,086

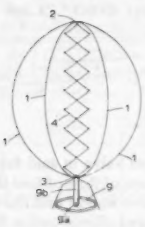
AEROSTATS AND AQUASTATS

William Douglas Cooke, The Rowans, Love Lane, Iver, Buckinghamshire, England

Filed Oct. 20, 1975, Ser. No. 624,045

Int. Cl.² B64B *1/58, 1/40*

U.S. Cl. 244—30 **5 Claims**



2. A device for providing buoyancy in a fluid when submerged in the fluid, said device comprising a sealed envelope of flexible material impervious to the passage of gas therethrough, said envelope being evacuated so as to contain at most gas at a predetermined pressure substantially lower than that of the fluid in which the device is buoyant, a frame comprising a plurality of resilient elongated rods each extending along a portion of the envelope, first means connecting said rods together at first ends thereof, second means connecting said rods together at second ends thereof, a lazy-tongs linkage comprising a series of pairs of rigid links, the links in each pair being pivoted together at their centres and the ends of each link in each such pair being pivoted to links respectively in adjacent pairs in said series, a first pair of further links pivoted to said first connecting means and respectively connected to the ends of the links at one end of said series, and a second pair of further links pivoted to said second connecting means and respectively connected to the ends of the links at the other end of said series, diverging extensions on said second pair of further links projecting outside said envelope and controlled mechanical means operative on said extensions to adjust the divergence thereof and consequently the length of said lazy-tongs linkage, whereby opposed forces respectively acting on said first and second means produce simultaneous changes in the curvature of said rods, said rods being operative on said envelope when increasing their curvature to distend said envelope from a condition in which it encloses a comparatively small volume to a condition in which it encloses a comparatively large volume thereby increasing the buoyancy of the device in relation to the fluid.

4,032,087

AIRCRAFT SPOILER SYSTEM

Prentiss B. Cleaves, 4542 Norma Drive, San Diego, Calif. 92115

Continuation of Ser. No. 550,354, Feb. 18, 1975, abandoned. This application June 3, 1976, Ser. No. 692,360

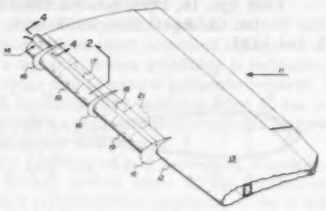
Int. Cl.² B64C *3/58*

U.S. Cl. 244—214 **3 Claims**

3. An aircraft spoiler system comprising:

a retro-fit mounting having a geometry of a predetermined aircraft wing leading edge, said retro-fit mounting being fixedly attached to the leading edge of an aircraft wing providing an extension thereof;

at least one spoiler rod having one substantially flat surface portion, said at least one spoiler rod disposed within said retro-fit mounting and rotatably carried thereby, said



spoiler rod having a geometry for being flush with the surface of said retro-fit mounting in one extreme rotative position; and

a control system disposed within said retro-fit mounting for controlling the axial rotative position of said at least one spoiler rod.

4,032,088

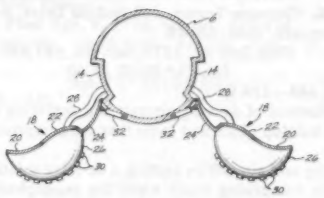
OUTRIGGER AIR BAG LANDING SYSTEM

John Jerome McAvoy, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 8, 1976, Ser. No. 675,004

Int. Cl.² B64C *25/56*

U.S. Cl. 244—100 A **2 Claims**



1. An air bag landing system for an aircraft having a fuselage comprising:

a. rigid member means having a first, second and third portion mounted to each side of the fuselage, said first, second and third portions being pivotally connected so that said first and second portions are pivotally connected to each other, said second and third portions are pivotally connected to each other, and said third portion is pivotally mounted to the fuselage to allow folding of said portions;

b. inflatable bag means sealably mounted to the underside of said rigid member means;

c. inflating means for inflating said inflatable bag means whereby said inflatable bag means is able to cushion the aircraft at landing;

d. containment means for containing said rigid member means and said inflatable bag means during cruise operation so that said rigid member means forms a portion of the external surface of the fuselage while the inflatable bag means is completely within said containment means; and

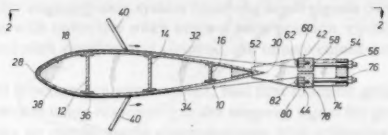
e. actuating means connected to the aircraft and to said rigid member means for extending said rigid member means and said inflatable bag means during landing and retracting said rigid member means and said inflatable bag means during cruise operation.

4,032,089

SURFACE FINISHING

Jack A. Kinzler, Seabrook; James T. Heffernan, Friendswood; Leroy G. Fehrenkamp, Houston, and William S. Lee, Friendswood, all of Tex., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 16, 1975, Ser. No. 568,541
Int. Cl.² B64C *1/00*; B32B *3/00*
U.S. Cl. 244—123 **5 Claims**



1. A smooth-surfaced airfoil comprising

a. an airfoil structure having a metal skin with surface irregularities,

b. an outer layer of a tensioned sheet of preformed film material of a controlled uniformed thickness in the range of from 0.002 inches to 0.030 inches, said film material being lightweight, flexible, and substantially inelastic, and

c. an adhesive/filler layer disposed between and bonding together said metal skin and said outer layer of film material, said adhesive/filler layer being of a solidhomogeneous material of uniform density and of a varying thickness from an amount just sufficient to act as an adhesive, such amount being less than the thickness of the outer layer, to an amount just sufficient to fill in said surface irregularities.

4,032,090

METHOD FOR DEICING AIRCRAFT

Walter E. Thornton-Trump, 108 Bellvue Drive, Beaver Lake, Plattsmouth, Nebr. 68048

Filed July 21, 1975, Ser. No. 597,490
Int. Cl.² B64D *15/10*
U.S. Cl. 244—134 C **6 Claims**

3. A method of de-icing aircraft and anti-icing the same to prevent buildup of ice and snow thereon comprising the steps of:

de-icing said aircraft by heating a de-icing solution substantially comprising water when the atmospheric temperature is at or above 20° F, said solution being heated to a temperature within the range of about 160° F to about 190° F and directing the said de-icing solution toward the skin of said aircraft in a concentrated flow to maximize the heat transfer of said heated solution to said skin and to also wash away any snow and ice that is present thereon;

anti-icing said aircraft by spraying a foglike spray to provide said skin with a thin dust coat with an anti-icing solution substantially comprising water and a predetermined low percentage of about 30% glycol in sufficient quantity that run off of said anti-icing is almost eliminated;

the combination of said de-icing and anti-icing steps resulting in virtually no run off of glycol onto the ground.

4,032,091

FUEL LINE EVACUATION SYSTEM

Thomas J. Reddy, Mentor, Ohio, assignor to Thomas J. Reddy, Trustee, Mentor, Ohio

Filed Mar. 5, 1976, Ser. No. 664,308
Int. Cl.² B64D *37/32*; A62C *1/10*
U.S. Cl. 244—135 R **11 Claims**

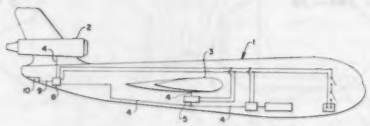
1. A fuel line evacuation system for aircraft including a fluid fuel operable engine, a tank for the fuel, and a fuel line connecting the tank to the engine, said system comprising:

means providing a vent for said fuel line;

a vent control valve means in said fuel line near the engine and normally in a first operative position in which, concurrently, the vent control valve means admits fuel to the engine and prevents the escape; of fuel from the vent, and movable to a second operative position in which, concurrently, the vent control valve means stops the admission of fuel to the engine and vents the fuel line through said vent;

a tank control valve means near the tank and normally in a first operative position in which the tank control valve means connects the tank to said fuel line, and movable to a second operative position in which the tank control valve means blocks the flow of fuel from the tank to said fuel line;

a pressurized source of evacuation fluid;



an evacuation control valve in said fuel line in advance, in the normal direction of flow of fuel through said fuel line, of both of said valve means and normally closed for preventing the discharge of evacuation fluid from said source into said fuel line, and movable to an open position in which it admits said evacuation fluid into said fuel line; and

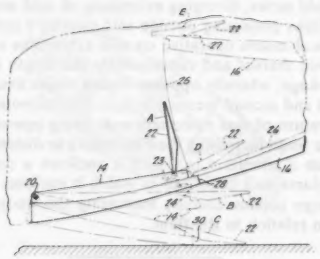
sequence control means connected to both of said valve means and said evacuation valve and operable for causing sequential operation thereof in a sequence such that the tank control valve means is closed not later than at the time said vent control valve means and the evacuation control valve are opened.

4,032,092

RAMP WITH INTEGRAL TOES

John H. Day, Pacific Palisades, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Dec. 22, 1975, Ser. No. 643,506
Int. Cl.² B64C *1/14*
U.S. Cl. 244—137 R **9 Claims**



1. In an aircraft including a movable loading ramp with at least one ramp toe having a hinged connection for rotation with respect to said ramp, the improvement comprising:

first abutment means connected to said aircraft;

second abutment means connected to said ramp;

third abutment means connected to said toe positioned to engage said second abutment means and to restrict rotation in a first direction of said toe with respect to said ramp when said toe is in a first predetermined position with respect to said ramp; and

an actuating crank operatively connected to said toe having

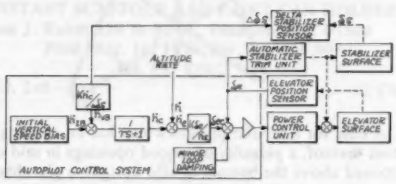
an end out of alignment with said hinged connection, said end being positioned to engage said first abutment means as said ramp is moved from an open position to a closed position and to disengage said first abutment means as said ramp is moved from a closed position to an open position, whereby said actuating crank rotates said toe when said end is in contact with said first abutment means and said ramp is moving.

4,032,093

ADAPTIVE ENERGY MANAGEMENT FOR VERTICAL SPEED CONTROL OF AN AIRCRAFT

Jimmie Harold Bonne, and Robert D. Simpson, both of Bellevue, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed June 27, 1975, Ser. No. 591,253
Int. Cl.² G05D *1/08*
U.S. Cl. 244—180 **1 Claim**



1. In combination in an aircraft flight control system having means for processing signals (h_{VB}) representative of maximum vertical speed bias, the improvement comprising:

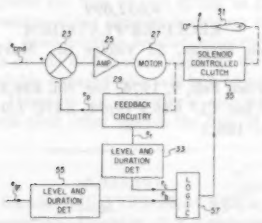
feedback circuit means including delta stabilizer position sensing means responsive to a stabilizer position of an aircraft for providing a delta stabilizer position signal $\Delta\delta_s$, said feedback circuit means further having an operand $Kh_c/\Delta\delta_s$ for providing said signals (h_{VB}) representative of maximum vertical speed bias.

4,032,094

CONTROL OF POSITIONING SYSTEM AUTHORITY OVER AIRCRAFT CONTROL SURFACES AS A FUNCTION OF SURFACE MOVEMENT RATE

Charles P. Morgan, Marion, and Jean L. Lamy, Cedar Rapids, both of Iowa, assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 19, 1976, Ser. No. 687,588
Int. Cl.² G05D *1/00*
U.S. Cl. 244—194 **8 Claims**



1. A system for controlling the movement of an aircraft flight control surface comprising:

first means for positioning said control surface in accordance with an input command signal, and providing a signal S_a whose amplitude is indicative of the instantaneous rate of control surface movement,

second means comprising level and duration detecting means for providing a signal S_b which indicates when S_a has continuously exceeded a predetermined amplitude A_1 for at least a predetermined time Δ_1, and

third means responsive to S_b for reducing the authority of said first means over said aircraft control surface when S_a has continuously exceeded said predetermined amplitude A_1 for at least said predetermined time Δ_1.

6. A method for controlling the movement of an aircraft flight control surface comprising:

providing means for positioning said control surface in accordance with an input command signal,

providing a signal S_a whose amplitude is indicative of the instantaneous rate of control surface movement,

providing a signal S_b which indicates when S_a has continuously exceeded a predetermined amplitude A_1 for at least a predetermined time Δ_1, and

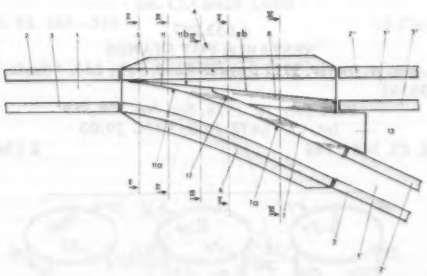
reducing the authority of said positioning means over said aircraft control surface when S_a has continuously exceeded said predetermined amplitude A_1 for at least said predetermined time Δ_1.

4,032,095

CENTRAL GUIDE SYSTEM FOR VEHICLES

Daniel Ferbeck, Issy les Moulineaux; René Groznykh, Maisons Laffitte, and Patrick de la Ville de Rigne, Sevres, all of France, assignors to Engins Matra and de Dietrich & CIA, both of Paris, France

Filed Apr. 9, 1976, Ser. No. 675,474
Claims priority, application France, Apr. 14, 1975, 75.11586
Int. Cl.² E01B *7/02*
U.S. Cl. 246—442 **4 Claims**



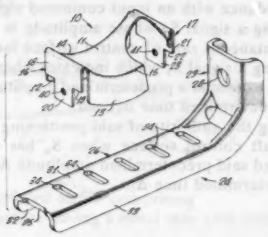
1. A rail points system for a rail turn-out for connecting one track, having two guard rails defining a flange way, selectively to either of two other tracks, each of the other tracks comprising two guard rails defining, respectively, two flange ways, said points system comprising a point and separate matching point respectively having heel ends respectively aligned with a rail of each of the other two tracks, said point and matching point having opposed side portions engaged with one another, said point and matching point being connected for lateral movement in unison between a first position where said one track is connected to one of the other two tracks and a second position where said one track is connected to the second of said other two tracks, and said connecton being such that limited longitudinal sliding movement occurs between the point and matching point during said lateral movement.

4,032,096

CURVED BRACKET ADAPTER

Frederick Perrault, 2644 W. 225th St., Torrance, Calif. 90505, and Raymond E. Perrault, 2404 Colt Road, Rancho Palos Verdes, Calif. 90274

Filed Mar. 3, 1976, Ser. No. 663,629
Int. Cl.² F16L 3/08
U.S. Cl. 248—73 19 Claims



1. An adapter for providing a curved supporting surface on a bracket comprising

a member having

an arcuate wall having side and end edges, a convex surface and a concave surface,

a side flange adjacent either of said side edges and extending outwardly from said convex surface of said arcuate wall,

and an end flange adjacent either of said end edges and extending outwardly from said convex surface of said arcuate wall,

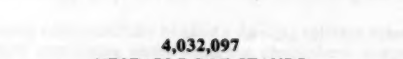
said end flanges having transverse edges intermediate said arcuate wall and the outer edges thereof.

4,032,097

NESTABLE POT STANDS

Thomas H. Dwyer, 3711 Roswell Road, Suite 255, Atlanta, Ga. 30342

Filed July 26, 1976, Ser. No. 708,589
Int. Cl.² A47F 7/00; A47G 29/00
U.S. Cl. 248—146 2 Claims



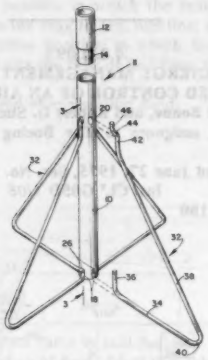
1. In a pot stand arrangement: a plurality of individual pot stands each comprising a circular support ring, and all of said support rings being of substantially the same diameter, each of said pot stands having a plurality of support legs mounted on the outside thereof and the legs of one stand being longer than the legs of any other stand, said pot stands being stackable with the support rings of one stand on top of another and with the stand having the longest legs being the lowermost stand and any other stand having the legs thereof outside of and extending down the outside of the ring of said lowermost stand, the inside surfaces of all legs on a stand being included in a cylindrical plane of larger diameter than the diameter of the rings whereby the legs of one ring fit outside the ring of another stand.

4,032,098

BASE FOR AN UPRIGHT FOR FORMING A STAND OR THE LIKE

Howard J. Marschak, 865 W. North Ave., Chicago, Ill. 60622

Filed Apr. 23, 1976, Ser. No. 679,860
Int. Cl.² F16M 11/32
U.S. Cl. 248—165 2 Claims



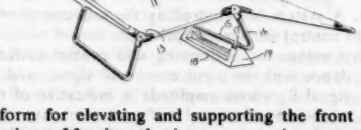
1. A base for a tubular upright which has an opening at the bottom thereof, a plurality of spaced openings in said upright positioned above the bottom of said upright, a plurality of leg members detachably secured to said tubular upright to support the upright in a vertical position, each of the leg members formed of wire having a substantially small diameter in cross section and having a base portion and an inclined portion extending upwardly of the base with the upper end of the inclined portion having a hooking end which engages the spaced openings in said tubular upright with said hooking end positioned inside said tubular upright to secure the upper end of said leg member to said upright, said base portion having an upwardly extending inner end substantially at right angles to said base portion, said bottom of said tubular upright having spaced slots, a connector insertable inside said tubular member from the bottom of the tubular upright and positioned above the bottom of the tubular upright, said connector having spaced lugs engaging said spaced slots to retain said connector in said tubular upright, said connector further having central openings to receive the upwardly extending inner ends of said legs, said base portions of said legs entering the spaced slots of said tubular upright below said connecting with the upwardly extending inner ends thereof extending through the central openings of said connector to secure the bottom of said legs to said connector and to said tubular member.

4,032,099

RECLINER PLATFORM

James Walton Maude, 52 Village St., Marblehead, Mass. 01945

Filed Feb. 9, 1976, Ser. No. 656,815
Int. Cl.³ A45D 19/04; A47C 1/02
U.S. Cl. 248—188.2 1 Claim



1. A platform for elevating and supporting the front leg portion of a piece of furniture having a seat section, comprising

a base plate, side members rigidly attached at opposite ends of said base plate,

each of said side members having upwardly inclined, converging surface portions rising from said base plate and terminating in a support surface, said support surface being smoothly contoured to fit the shape of said front leg portion,

each of said inclined surface portions having a cavity located therein adjacent its respective support surface, and

each of said members further including a spring tempered retaining clip having off-set tabs received in the cavities of said side members, said support surface and said retaining clip receiving said front leg portion;

whereby said platform will automatically properly position itself under the front leg portion when the piece of furniture is manually raised, said platform being movable to an inactive position wherein the front leg portion is no longer elevated.

4,032,100

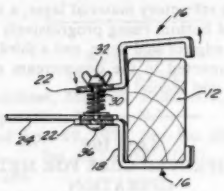
INSTANT SCAFFOLD AND PAINT CAN HOLDER

William J. Kahn, 320 E. 30 St., Paterson, N.J. 07504

Filed Mar. 11, 1976, Ser. No. 666,009

Int. Cl.² E06C 7/14

U.S. Cl. 248—211 **12 Claims**



1. A support device comprising a pair of opposed bracket members of substantially identical configuration adapted to receive a support post element therebetween, said bracket members each including a flange element extending outwardly therefrom and located in parallel relation to each other; a one piece generally L-shaped support bar having first and second angularly related legs; and means for pivotally securing said bar to said bracket members between said flange elements adjacent the juncture between said angularly related legs; said securing means including a pivot pin comprising a threaded bolt extending through said flange elements and said support bar, and a coil spring surrounding said bolt and having opposite ends respectively engaged between one of said flange elements and said support bar for biasing said flange elements apart and for holding said support bar adjacent the other of said flange elements whereby said bracket elements may be urged apart against the bias of said spring to permit adjustment of the position of the support device on said post; said bolt including a head portion located adjacent one of said flange elements on the side thereof opposite the support bar; and a nut threadably engaged with said bolt adjacent the other of said flange elements for selectively moving said flange elements towards each other against the bias of said spring.

4,032,101

CLAMPING-TYPE BRACKET

Vincent J. Immordino, Flushing, N.Y., assignor to Display Originals, Inc., Flushing, N.Y.

Filed Mar. 31, 1976, Ser. No. 672,063

Int. Cl.² A47J 3/14

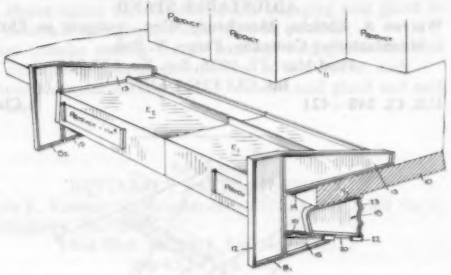
U.S. Cl. 248—225.4 **5 Claims**

1. A clamping-type bracket which is attachable without tools to a shelf or other boardlike member to support extension shelves or other objects, said bracket comprising:

A. a vertical beam whose position relative to the edge of the shelf is settable to a point abutting the edge and to points well spaced from the edge;

B. an upper arm extending laterally from the upper end of said beam, the upper arm being adapted to rest on the top surface of the shelf;

C. a lower arm extending laterally from the lower end of the beam in the same direction as said upper arm, the lower arm having a ramp formation whose sloping surface is treaded, the ramp extending below the undersurface of the shelf to define a free space converging toward the vertical beam; and



D. a wedge-shaped locking piece insertable into said free space to clamp said bracket to said shelf regardless of the set position of the beam relative to the shelf edge, said piece having an upper edge which engages the undersurface of the shelf and a treaded sloping lower edge which complements the sloping surface of the ramp, whereby when said piece is inserted it rides up the ramp until it is wedged into the free space, said ramp tread being provided on either bank with guide tabs to confine the locking piece to said ramp.

4,032,102

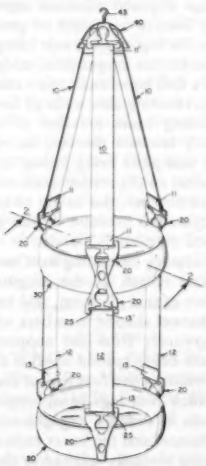
TRAY SUSPENSION MEANS

Linda S. Wolf, 44 Loucks Ave., Los Alto, Calif. 94022, and Roussel G. Smith, Jr., 1030 Pine St., Menlo Park, Calif. 94025

Filed May 6, 1976, Ser. No. 683,738

Int. Cl.² B42F 13/00

U.S. Cl. 248—318 **13 Claims**



1. A suspension structure comprising in combination:

a plurality of suspension members;

a plurality of couplers engaging said members, each of said

couplers has an elongated tapered portion terminating in a curl at the narrowest part thereof and has at least one generally circular aperture in the elongated portion and an elongated open-ended slit in the widest portion thereof in direction orthogonal to the elongated portion;

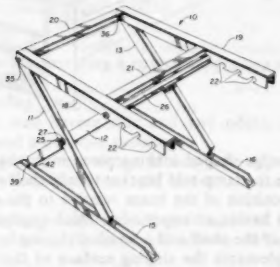
at least one tray having means integral therewith interlocking with said couplers; and

a hangar secured to said members and providing a common junction for at least some of said members.

4,032,103
ADJUSTABLE STAND

Warren A. Ehrichs, Moorhead, Minn., assignor to Ehrichs Manufacturing Company, Fargo, N. Dak.

Filed Mar. 17, 1976, Ser. No. 667,713
Int. Cl.² F16M *13/00*
U.S. Cl. 248—421 **6 Claims**



1. An adjustable stand for supporting heavy loads at various heights, said stand comprising:

a platform comprising four channel shaped beam members rigidly fastened together in a generally rectangular configuration and having upper surfaces all disposed in a common plane to provide a flat supporting surface, two of said beam members being relatively long and extending longitudinally of said platform, the spaced side walls of said longitudinally extending channel shaped beam members extending downwardly and each having longitudinally spaced notches extending inwardly from the lower edges thereof,

two pairs of legs disposed adjacent opposite sides of said platform and formed of beams of generally rectangular cross-section, the legs of each pair being pivotally secured together adjacent the longitudinal midpoints thereof, the upper end of a first leg of each pair extending between the downwardly extending side walls of the adjacent longitudinally extending beam member of said platform and being pivotally secured thereto, the upper ends of the other legs of said pairs being joined by a rod member of a cross-sectional configuration such as to fit within pairs of said spaced notches, the height of said platform being dependent upon the location of the pair of notches in which said rod member is placed,

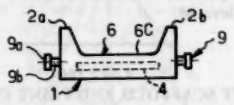
a pair of longitudinally extending base members of substantially the same length as the longitudinally extending beam members of said platform, said base members being formed of channel shaped members with upturned walls extending upwardly from the supporting surface, said upturned walls being spaced apart a distance at least as great as the width of the first legs of each pair of legs, the bottoms of such first legs being disposed between said upturned walls in slidable engagement with the bottom wall of the channel and the lower ends of the other legs of said pairs being pivotally secured to the side walls of said channels and of a length to engage a supporting surface, and

resilient means biasing said legs towards a position in which said platform is at its maximum height to tend to counterbalance the weight of said platform and said legs and hence facilitating the vertical adjustment of said stand.

4,032,104
INGOT CASTING MOULD IN PARTICULAR FOR FERROMANGANESE

Francis Joseph Antoine Pepin, Nancy, France, assignor to Societe Nouvelle des Acieries de Pampey, Neuilly-sur-Seine, France

Filed Feb. 24, 1976, Ser. No. 660,786
Claims priority, application France, Feb. 26, 1975, 75.06041
Int. Cl.² B22D *7/06*
U.S. Cl. 249—114 **4 Claims**

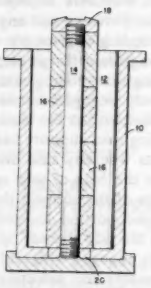


1. Ingot casting mould, consisting of a cast-iron body having a closed upstream end and a closed downstream end and successively comprising, from said upstream end to said downstream end at least one first section, the bottom wall of which is provided with a refractory material layer, a second section, having an inclined bottom rising progressively from the adjacent downstream edge of said layer, and a third section having a flat bottom connected to the downstream edge of the inclined bottom of said second section.

4,032,105
MOLD WITH IMPROVED CORE FOR METAL CASTING OPERATION

Verne B. Gritzner, and Donald W. Hackett, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 25, 1975, Ser. No. 571,445
Int. Cl.² B29C *1/06*, *9/10*, *9/24*
U.S. Cl. 249—134 **2 Claims**



1. A mold for use in the process of casting molten metallic material into a hollow article of a desired configuration comprising a housing having a metal receiving receptacle therein and a core disposed within said receptacle for defining therewith an annulus in the desired configuration, said core being separable from the cast article and being characterized by having at least a portion thereof formed of carbon foam with said portion being contactable by the molten metallic material forming the article and possessing both sufficient strength to resist deformation during the introduction of the molten metallic material into said annulus and adequate yieldability to undergo deformation during the solidification and attendant contraction of the molten metallic material for inhibiting

deleterious internal stresses leading to cracking or weak areas from occurring in the article during said contraction.

4,032,106
SELF-SEALING VALVE

Warren J. Schieser; John R. Sneeden; R. Alan Feltner, all of Columbus, and Curtis J. Bond, Marion, all of Ohio, assignors to Corco, Inc., Worthington, Ohio

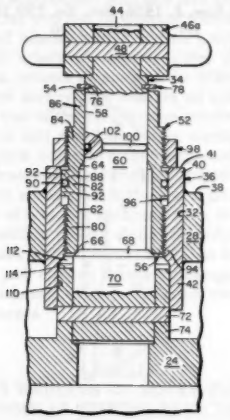
Filed June 4, 1976, Ser. No. 693,220
Int. Cl.² F16K *7/06*
U.S. Cl. 251—144 **11 Claims**

11. A self-sealing valve comprising a housing of annular form having an open inner end and an outer closed end, a flexible normally-convex diaphragm wall closing the outer end, an an inner valve member carried by said flexible wall for axial inward displacement upon applying inward pressure to said wall, said valve member having a convex outer wall complemental to said convex flexible wall and normally seating thereagainst, and an axially inwardly-extending sealing skirt carried by said convex wall of the valve member, said skirt having an outer frusto-conical sealing surface and said housing having an inner complemental frusto-conical sealing surface normally in sealing contact, and an outlet leading from the housing at said sealing surface thereof and normally covered by said skirt.

4,032,107
PLUG VALVE

Jay Robert Kelchner, Montour Falls, N.Y., assignor to The Hilliard Corporation, Elmira, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,547
Int. Cl.² F16K *31/00*
U.S. Cl. 251—296 **8 Claims**



1. in combination with a plug valve of the type including a valve casing having several ports communicating with a valve bore and a cover plate at one end of said valve casing having an opening therethrough, plug means within said valve bore for controlling flow through said ports, an operating stem connected coaxially to an upper end of said plug means and extending through said cover opening, handle means connected to an outer end of said stem for turning said plug to at least two rotational positions in said bore, and means associated with said handle means and said cover for stopping the rotation of said handle at said two rotational positions, the improvement which comprises means for lifting and lowering said plug from and into said bore including:

a sleeve member within said cover plate opening having a threaded inner surface portion and a smooth cylindrical inner surface portion and an upper end projecting above said cover plate;

said stem having a first annular stop means at an upper end portion thereof and a second annular stop means at a lower end portion thereof;

gland means rotatable within said sleeve threaded portion for selectively bearing upwardly against said first stop means to lift said plug means from said bore and thereafter downwardly against said second stop means to force said plug means into said bore;

means at the upper end of the gland for turning said gland;

locknut means rotatable on said gland and against said sleeve upper end for selectively engaging said gland to maintain said gland in said lowered position;

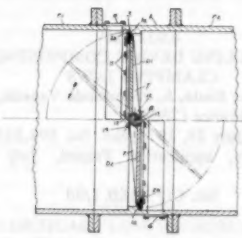
first annular sealing means between said gland and said cylindrical inner surface portion of said sleeve; and,

second annular sealing means between said gland and said stem.

4,032,108
BUTTERFLY VALVE ASSEMBLY

Edwin K. Kintner, McNaugher Heights, P.O. Box A-RD No. 4, Johnstown, Pa. 15905

Filed Sept. 17, 1975, Ser. No. 614,312
Int. Cl.² F16K *1/22*
U.S. Cl. 251—306 **1 Claim**



1. In combination with spaced pipe ends of a fluid carrying line, a cylindrical housing bridging said pipe ends and interconnecting them and including metallic seats formed on the sides of a radially inwardly extending collar portion thereof, a butterfly type valve comprising a rotatably shaft, a sleeve surrounding and connected to said shaft, a pair of half disc of slightly smaller diameter than the inner diameter of said collar portion and integrally secured to diametrically opposite sides of said sleeve, said half discs being provided with integral fins disposed in parallel spaced relationship along said sleeve, extending from said sleeve to adjacent the perimeters of said half discs, and sealing half rings of greater diameter than said inner diameter and detachably connected to and projecting beyond the periphery of said half discs so as to form seals with said sides of said collar portion and a pair of arcuate cover plates, one upstream of said collar portion and the other downstream of said collar portion, each cover plate covering an arcuate hole of about 180° in said housing on substantially diametrically opposite sides of said butterfly valve to enable access thereto for replacing said sealing half rings.

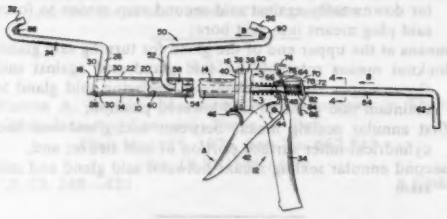
4,032,109
TENSIONING DEVICE

Toney H. Wilson, Rte. 2, Box 302D, Sarasota, Fla. 33577

Filed June 24, 1976, Ser. No. 699,781
Int. Cl.² B66F *1/00*
U.S. Cl. 254—69 **9 Claims**

1. A tensioning device of the type primarily intended for use in stretching fence wire, said device comprising: body means including a hand-gripping portion attached thereto; trigger means movably connected in operative relation to said hand-gripping portion; stationary hook means formed on said body

means; movable tensioning means at least partially disposed within said body means; said body means further comprising a tube portion extending forward of said hand-gripping portion; said tube portion having a keyway formed along its longitudinal dimension so as to permit a predetermined segment of said movable tensioning means to extend therethrough; and prime



mover means disposed within said body means in operative, interconnecting relationship between said trigger means and said movable tensioning means, whereby actuation of said trigger means will cause said prime mover means to advance said movable tensioning means along a predetermined path toward said stationary hook means.

4,032,110

CABLE HAULING DEVICE COMPRISING SELF CLAMPING JAWS

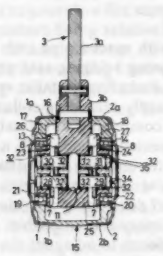
Johannes Augustus Rinio, 5, Promenade Venezia, Grand Siecle, Versailles, France (7800)

Filed July 24, 1975, Ser. No. 598,810

Claims priority, application France, July 25, 1974, 74.25837

Int. Cl.² B66D 1/00

U.S. Cl. 254—76 **7 Claims**



1. Cable hauling apparatus, comprising:

housing means;

first and second clamping jaw means mounted within said housing in spaced, aligned relationship, and adapted when in an open condition to receive a cable therethrough;

a first pair of spaced, parallel connecting rods connected at the rear ends thereof to said first clamping jaw means;

a second pair of spaced, parallel connecting rods connected at the rear ends thereof to said second clamping jaw means;

backward control lever means connected with said first and second clamping jaw means, and arranged to extend from said housing means;

a head member mounted at the forward end of said housing means, and separate therefrom, said head member including a pair of lateral portions having aligned bores therethrough arranged concentrically about an axis extending transversely of said first and second jaw means, said lateral portions being connected at the forward end thereof, and being open at their rearward end facing said first and second jaw means;

a forward control lever, including a lower body portion receivable between said lateral portions of said head member, said lower body portion having axially aligned trunnions on the opposite sides thereof receivable within said aligned bores in said head member, whereby said forward control lever is mounted for pivotal movement about said transverse axis, said forward control lever further including a handle portion arranged to extend outwardly from said head member and said housing means; and

first and second, transversely extending pivot pin means carried by said lower body portion of said forward control lever, said first and said second pivot pins means being mounted within the outer diameter of said aligned trunnions on opposite sides of and spaced outwardly from said transverse pivot axis;

the forward ends of said first and said second pair of said parallel connecting rods being connected with said first and said second pivot pin means, respectively.

4,032,111

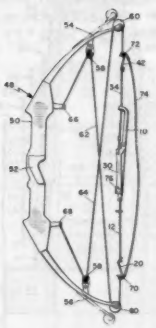
TOGGLE CLAMP FOR STRINGING COMPOUND BOW

Thomas Aubrey Garrett, 4520 Piute Place, San Diego, Calif. 92117

Filed Nov. 5, 1976, Ser. No. 739,289

Int. Cl.² B66F 3/00

U.S. Cl. 254—77 **8 Claims**



1. An apparatus for stringing archery bows, said apparatus comprising,

an elongated body member having cable guide means on one end,

a lever pivotally connected to said body member intermediate the ends thereof by means defining a fulcrum,

first connecting means on the other end of said elongated body member for releasably connecting said other end of said body member to one end of an archery bow,

second connecting means including an elongated cable connected at one end to said lever at a point spaced from said fulcrum and extending through said guide means to the other end of said bow so that pivotal movement of said lever on said body member in one direction pulls the ends of said bow toward one another for stringing said bow.

4,032,112
CLIMBING JACK

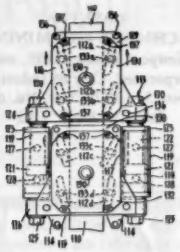
Hans Heinrich Schmidt, Doncaster, Australia, assignor to Enor Nominees Pty Limited, Victoria, Australia

Division of Ser. No. 554,235, Feb. 28, 1975, Pat. No. 4,016,228, which is a division of Ser. No. 448,716, March 6, 1974, abandoned. This application Mar. 16, 1976, Ser. No. 667,451

Claims priority, application Australia, Mar. 7, 1973, 2511/73; Mar. 7, 1973, 2513/73

Int. Cl.² B66F *1/08*

U.S. Cl. 254—108 **18 Claims**



1. A climbing jack comprising jack column means, a plurality of receiving means substantially evenly spaced along said column means, a jack assembly means surrounding said column means and including a first jack section means and a second jack section means, each said jack section means including at least one lever means having an axle which extends substantially transversely of the longitudinal axis of said column means, said lever means having opposite ends selectively adapted by being pivoted about the axle to move either one of the ends into contact with said jack column means and to move the other end out of contact with said jack column means, opposed biasing spring means associated with said lever means for selectively biasing either one of said ends toward said jack column means and the other end away from said jack column means, and wherein an end of at least one lever means in one of the jack section means is in supporting engagement with said receiving means during relative movement of said jack column means and said jack assembly means, and at least one force applying means connecting said first jack section means and said second jack section means for moving one of said jack section means, in turn, relative to the other jack section means, along said column means while the said other jack section means is held in fixed relationship relative to said jack column means by engagement of at least one lever means in said other jack section means with at least one receiving means.

4,032,113
WINCHES FOR HAULING ON BOARD PURSE NETS OR SIMILAR FISHING DEVICES

Kolbjorn Bjorshol, 6560 Langoyneset, Norway

Filed Apr. 17, 1975, Ser. No. 569,012

Claims priority, application Norway, Apr. 26, 1974, 741513

Int. Cl.² A01K *73/06*

U.S. Cl. 254—138 **9 Claims**

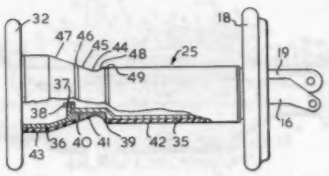
1. In a winch for hauling a purse net on board a fishing vessel comprising at least two rollers rotatable in mutually opposite directions for pulling said net by frictional engagement therewith, a common pivotable end member from which the rollers project freely outwards in spaced apart relation and for adjusting said rollers in various oblique positions relative to a vertical plane, wherein each of said rollers comprises:

an inner rest portion having friction-promoting means on its surface;

an outer rest portion having friction-promoting means on its surface;

said inner rest portion having a diameter smaller than said outer rest portion; and

an annular portion arranged between said inner and outer rest portions thereby constituting a net-slide portion said net-slide portion being formed without friction-promoting means on its surface, the net, when being hauled by said winch, normally rides over said inner rest portion of said rollers, a float-portion of said net being made to



selectively ride over said annular portion and said outer rest portion as regulated by the oblique positioning of said rollers, when riding over said outer rest portion said float-portion moves at increased speed with respect to that portion of the net riding over said inner rest portion, and when riding over said annular portion said float-portion moves at decreased speed with respect to that portion of the net riding over said inner rest portion.

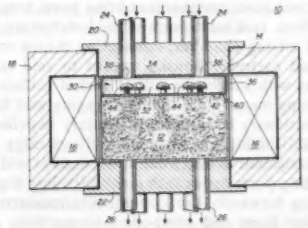
4,032,114
VORTICAL FLOW DISTRIBUTOR

Henry H. Kolm, Wayland, and John A. Oberteuffer, Lexington, both of Mass., assignors to Sala Magnetics, Inc., Cambridge, Mass.

Filed June 30, 1976, Ser. No. 701,426

Int. Cl.² B01F *15/00*

U.S. Cl. 259—4 R **13 Claims**



1. A vortical flow distributor for uniformly, vortically distributing incoming fluid in a plane transverse to the primary flow direction, comprising:

an outlet and at least one smaller inlet;

a plenum chamber disposed between said inlet and outlet and having an area corresponding to the area of the outlet and having a length in the primary flow direction which is substantially less than its width; and

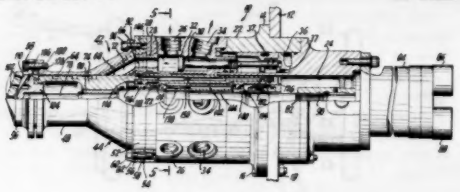
a flow diverter aligned with each said inlet for directing the incoming fluid into a plane transverse to the primary flow direction and for establishing a tangential flow with radial components for producing over the plenum chamber area a pattern of distributed vorticity which finally dissipates the flow velocity.

4,032,115

DEVICE FOR MIXING COMPONENTS WHICH FORM A PLASTIC

August Wintels, La Val, and Christopher J. M. Ives, Beaconsfield, both of Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed June 21, 1976, Ser. No. 697,928
Int. Cl.² B01F 7/00, 7/24
U.S. Cl. 259—7 **16 Claims**



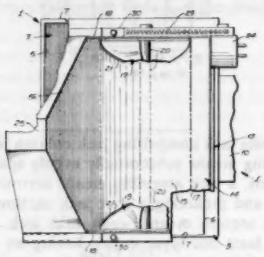
1. In a device for blending flowable components together to form a plastic therefrom, stationary housing means having a front end face and formed with an axial bore extending rearwardly along the interior of said stationary housing means from said front end face thereof, said stationary housing means having an outer surface and being formed outwardly of said axial bore with a plurality of inlet ports each extending from said outer surface of said stationary housing means to said front end face thereof for respectively receiving components to be blended together and for delivering the components to the front end face of said stationary housing means, a cartridge removably connected with said stationary housing means, said cartridge having an elongated tubular cartridge housing means having a rear portion extending into said axial bore of said stationary housing means, an elongated front portion extending forwardly from said stationary housing means, and at a junction between said rear and front portions an annular rearwardly directed surface fluid-tightly engaging said front end face of said stationary housing means, said front portion of said cartridge housing means having a hollow interior defining a mixing chamber and said cartridge housing means being formed with a plurality of component-transmitting ports respectively communicating with said inlet ports of said stationary housing means at said front end face thereof and each extending from said rearwardly directed surface of said cartridge housing means to said mixing chamber where said component-transmitting ports terminate in front outlet ends, so that said component-transmitting ports transmit the components from said inlet ports of said stationary housing means to said mixing chamber, connecting means releasably connecting said cartridge housing means to said stationary housing means with said rearwardly directed surface of said cartridge housing means fluid-tightly engaging said front end face of said stationary housing means, rotary impeller means situated in said mixing chamber of said cartridge housing means closely adjacent to said front outlet ends of said component-transmitting ports for agitating and blending together as well as feeding forwardly the components received in said mixing chamber from said component-transmitting ports of said cartridge housing means, rotary drive shaft means fixed to said impeller means and extending therefrom rearwardly along and through said rear portion of said cartridge housing means and beyond the latter along said axial bore of said stationary housing means, drive means carried by a rear portion of said stationary housing means and releasably connected with said drive shaft means at a portion thereof which extends rearwardly beyond said cartridge housing means for driving said drive shaft means when said cartridge housing means is connected by said connecting means with said stationary housing means, said rotary impeller means having a rear end surface surrounding said drive shaft and situated rearwardly of said front outlet ends of said component-transmitting ports of said cartridge housing means, sealing means carried by said cartridge housing means and having a fluid-tight sealing engagement with said rear end surface of said rotary impeller means for sealing off from said impeller means and mixing chamber the interior of said cartridge housing means which is situated to the rear of said impeller means, and dispensing nozzle means carried by said cartridge housing means at a front end of said front portion thereof for dispensing the blended components from said mixing chamber, whereby said cartridge housing means may be removed from said stationary housing means together with said drive shaft means, said impeller means connected thereto, said dispensing nozzle means, and said sealing means.

4,032,116

MIXER ATTACHMENT FOR MINING VEHICLES

Evan S. Prichard, Newport Beach, Calif., assignor to Challenge-Cook Bros., Incorporated, City of Industry, Calif.

Filed Dec. 31, 1975, Ser. No. 635,707
Int. Cl.² B01F 7/02
U.S. Cl. 259—69 **4 Claims**



1. In combination a vehicle having a scoop defined by upwardly diverging side walls, a semi-cylindrical bottom wall and essentially parallel end walls, a forwardly directed operator manipulatable lever structure for raising and lowering the scoop, a tilting mechanism and a power supply, and a mixer structure comprising:

a. a mixer shell removably seated in said scoop and having diverging side walls conforming to the side walls of the scoop, a semi-cylindrical bottom wall confronting the bottom wall of the scoop, and end walls received between the end walls of the scoop;

b. a rotatable mixer unit within said mixer shell and overlying the bottom wall of the mixer shell contiguous thereto;

c. and a mixer drive means mounted on the mixer shell and including a motor connectable to the vehicle power supply.

4,032,117

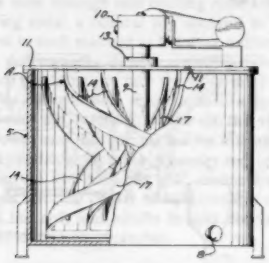
PASTE MIXER

Basil Arthur Burgess, Montreal, Canada, assignor to Bowers Machine Company Limited, Canada

Filed Sept. 15, 1975, Ser. No. 613,406
Claims priority, application Canada, Oct. 25, 1974, 212279
Int. Cl.² B01F 7/24
U.S. Cl. 259—108 **5 Claims**

1. A mixing apparatus for mixing paste materials comprising a mixing tank having side walls, a bottom wall and a top wall, a drive shaft centrally positioned in the top wall of the mixing tank so that the free end of the drive shaft extends into said tank, means for rotating the said shaft, a series of fixedly mounted baffles, said baffles being mounted with the upper ends thereof at the top on the tank and the lower, free ends thereof extending downwardly from the top of the tank, said baffles being helical and of generally semi-circular form as viewed in transverse cross-section, and being disposed radially in spaced relation about the axis of the drive shaft, a rotor crossbar secured to the free end of the said drive shaft adjacent to said bottom wall of the tank and below the lower free

ends of the said baffles, and a series of rotor blades secured at one end to the said crossbar, the said rotor blades being helical and of generally semi-circular form as viewed in transverse cross-section, and being disposed radially in spaced relation about the axis of the said drive shaft, the said baffles and rotor blades intermeshing with each other in radialiy spaced apart

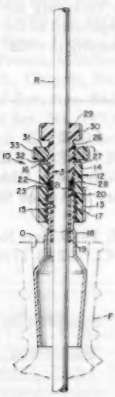


relationship, the said baffles and rotor blades being disposed radially about the axis of the said drive shaft in alternate semi-circular arrangement, the free ends of the baffles extending to within a short distance of the fixed ends of the rotor blades, and the free ends of the rotor blades extending to within a short distance of the fixed ends of the baffles.

4,032,118
SEALING MEANS FOR STIRRING APPARATUS

Edwin D. Phillips, 170 Albert St., N. Plainfield, N.J. 07060

Filed Oct. 21, 1975, Ser. No. 624,398
Int. Cl.[2] B01F *7/16;* F16C *33/72*
U.S. Cl. 259—122 10 Claims



1. In combination, a stirring apparatus including an elongate rod having stirrer blade means on one end thereof for disposition in a flask and the like to stir the contents of the flask and power means connected with the other end of the rod to rotate the rod and stirrer blade means, and a seal for effecting a liquid-tight seal between the stirring apparatus and an opening in a laboratory flask and the like, said seal including a generally tubular stopper for fitting in the opening of the flask, said stopper having a bore therethrough and external threads on one end thereof; a sleeve means having internal threads on both ends thereof and threadably engaged at one end thereof with the threads of the stopper and means for forming a positive seal between the threaded members; a bearing sleeve positioned within the bore defined in said stopper one end and having a shoulder thereon resting on the upper surface of said stopper one end; seal ring means positioned within the sleeve means in abutting engagement with the upper surface of said bearing sleeve shoulder; and a generally tubular seal clamping and adjusting means threadably engaged with the other end of the sleeve means and extended into engagement with the seal ring means to urge the seal ring means into secure sealing engagement with said rod extended coaxially through the stopper, sleeve means, seal ring means and seal clamping and adjusting means.

4,032,119
LANCE SEAL FOR CONVERTER VESSEL GAS COLLECTING HOOD

Joseph Ziegler, Apollo, Pa., assignor to Pennsylvania Engineering Corporation, Pittsburgh, Pa.

Filed Mar. 11, 1976, Ser. No. 666,038
Int. Cl.[2] C21C *5/40*
U.S. Cl. 266—158 27 Claims

1. A gas collecting hood disposed above the opening in a metallurgical vessel for collecting gases discharging therefrom,

a port formed in said hood to permit a lance to pass through said hood and into the opening in said vessel,

a seal assembly for said port and having an opening therein to permit said lance to pass therethrough in relatively closely spaced relation,

and resilient means for resiliently mounting said seal assembly for movement in a plane generally normal to the axis of the lance to permit movement of said lance in said opening in reaction to the discharge of gas from the lower end thereof, said resilient means permitting said seal assembly to move with said lance.

4,032,120
APPARATUS FOR DIRECT REDUCTION OF SULFUR-CONTAINING IRON ORE

Donald Beggs, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Filed Nov. 10, 1975, Ser. No. 630,489
Int. Cl.[2] C21B *1/06*
U.S. Cl. 266—159 6 Claims

1. Apparatus for producing a reductant-rich off-gas, a reductant-lean off-gas, and a metallized iron product from particulate impurity-containing iron ore comprising:

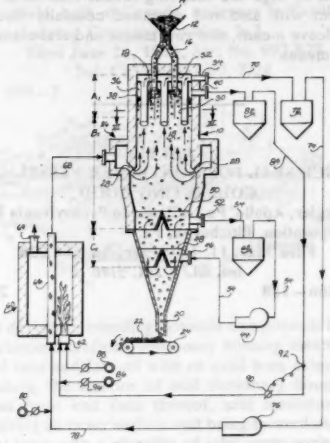
a. a generally vertical shaft furnace having an upper prereducing zone and a lower reducing zone;

b. means for charging particulate iron oxide material to said upper zone, and means for removing metallized iron product from the bottom of said lower zone, whereby a continuous gravitational flow of a packed bed of material can be established through the furnace;

c. a first gas inlet intermediate the ends of the furnace;

d. a first gas outlet consisting of a plurality of gas removal pipes extending downwardly into said furnace and terminating beneath said prereducing zone, the upper ends of

said pipes communicating with a reacted gas offtake system;



e. a reacted gas plenum at the top of said prereducing zone;

f. a second gas outlet communicating with said plenum.

4,032,121

PROCESS FOR THE PRODUCTION OF IRON FROM IRON ORES AND APPARATUS FOR CARRYING OUT SAID PROCESS

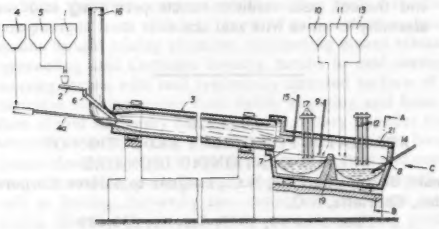
Kurt Stift, and Helwig Vacek, both of Leoben, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerek-Alpine Montan Aktiengesellschaft, Vienna, Austria

Division of Ser. No. 551,012, Feb. 19, 1975. This application Dec. 15, 1975, Ser. No. 640,567

Claims priority, application Austria, Feb. 22, 1974, 1473/74

Int. Cl.² C21B *13/08*

U.S. Cl. 266—163 **5 Claims**



1. Apparatus for the production of iron from iron ores comprising: a rotary kiln for reducing iron ore with carbon, said kiln having a discharge end for discharging a mixture of iron, slag and unreduced ore; a first hearth furnace for receiving the discharge from the discharge end of the kiln, said furnace having opposed side walls and end walls, one of which comprises a weir, which walls extend between the side walls, said weir having a lower height adjacent one side wall; a second hearth furnace separated from the first furnace by said weir and in communication with the first furnace above said weir; and means mounting said furnaces for tilting movement about a common axis extending through the plane of the wall comprising the weir so that fluid material can be transferred from the first furnace to the second furnace by tilting said furnaces in a direction to lower the position of said weir.

4,032,122

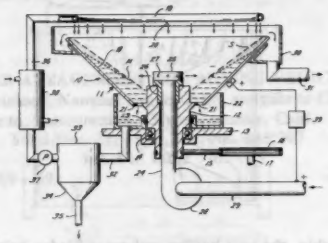
METHOD AND APPARATUS FOR RECOVERING SMALL PARTICLES OF HEAVY PRECIOUS METALS

Edward O. Anders, 1502 Tallulah Court, Houston, Tex. 77077

Division of Ser. No. 643,528, Dec. 22, 1975, Pat. No. 3,998,629. This application Aug. 25, 1976, Ser. No. 717,527

Int. Cl.² C22B *11/10*

U.S. Cl. 266—169 **11 Claims**



1. Apparatus for recovering small particles of heavy precious metals such as gold or platinum from a slurry, comprising a housing having a generally conical, converging inner wall, means for supplying Mercury onto the inner wall of the housing so as to cause a layer thereof to flow downwardly therealong, means for feeding the slurry to the layer of Mercury, means for rotating the housing about the vertical axis of the generally conical inner wall at a speed which induces the particles to settle in or amalgamate with the Mercury and causes the slurry to flow upwardly over the Mercury layer and out of the housing, means for collecting the Mercury layer and particles which flow downwardly therewith over the housing wall, means for separating the particles from the collected Mercury, and means for returning the Mercury from which the particles have been separated to the means for supplying it to the inner wall of the housing in order to maintain a continuous layer of Mercury.

4,032,123

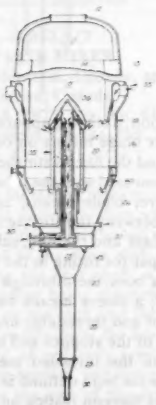
SHAFT FURNACE FOR DIRECT REDUCTION OF ORES

Clyde L. Cruse, Jr., Middletown, Ohio, and Joe H. Brown, Houston, Tex., assignors to Armco Steel Corporation, Middletown, Ohio

Filed Oct. 15, 1976, Ser. No. 732,885

Int. Cl.² C21B *11/00*

U.S. Cl. 266—186 **9 Claims**



1. In a gravity feed shaft-type furnace for the reduction of

sized iron ores having a feed zone, a reducing zone, a cooling zone and a discharge zone, the improvement comprising a substantially cylindrical reducing zone communicating directly with a substantially cylindrical cooling zone, an inwardly tapering discharge zone of generally ellipsoidal cross section, an elongated substantially cylindrical member axially disposed within said furnace and extending upwardly from said discharge zone through said cooling zone and terminating in said reducing zone, a conical top secured to said member and configured in such manner as to cause uniform movement of sized ores downwardly in said reducing zone, means for introducing hot reducing gas into the bottom of said cylindrical member for upward flow therein, means for distributing said hot reducing gas into the center of the reducing zone adjacent the lower end thereof, means for introducing cooling gas into said cylindrical member whereby to cool said means for distributing the hot reducing gas, means for distributing said cooling gas into the center of said cooling zone adjacent the lower end thereof, and means in said discharge zone for supporting said cylindrical member.

4,032,124

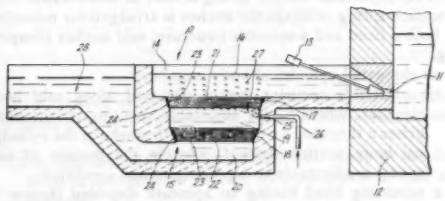
APPARATUS AND METHOD FOR IN-LINE DEGASSING AND FILTRATION OF MOLTEN METAL

John C. Yarwood, Madison, Conn.; James E. Dore, Ballwin, Mo., and Robert K. Preuss, Middletown, Conn., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Continuation-in-part of Ser. Nos. 563,213, March 28, 1975, Pat. No. 3,962,081, and Ser. No. 597,963, July 21, 1975. This application Feb. 2, 1976, Ser. No. 654,724

Int. Cl.² C22B 9/02, 9/10

U.S. Cl. 266—218 **13 Claims**



1. An apparatus for the degassing and filtration of molten metal which comprises a chamber having respective metal inlets and outlets, wall surfaces adapted for the support of at least a first and a second removable filter plate, and a first coarse grade ceramic foam filter plate located upstream in the flow of molten metal through said apparatus, and a second fine grade ceramic foam filter plate located spaced-apart and downsteam from said first filter plate in said molten metal flow, and a conduit providing a fluxing gas inlet port positioned between said first and said second filter plate in such relation to said first filter plate that fluxing gas issuing from said port is capable of percolation in a direction counter-current to said molten metal flow, through molten metal located adjacent thereto and into contact with said first filter plate for passage therethrough.

4,032,125

INSULATOR

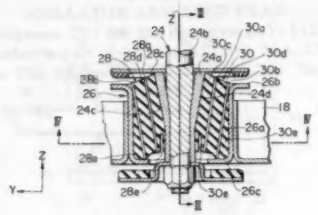
Masaaki Minakawa, Kokubunji, and Toshio Yoshikawa, Ayase, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Mar. 9, 1976, Ser. No. 665,336

Claims priority, application Japan, Mar. 17, 1975, 50-34656[U]

Int. Cl.² B60G 11/24

U.S. Cl. 267—63 A **3 Claims**



1. An insulator comprising:

an inner member with an axis having a wedge, said wedge including two surfaces which are inclined toward each other and disposed symmetrically about said axis;

an outer member around said wedge and spaced therefrom; and

two resilient means, each including alternate layers of rigid plates and elastomeric members, and inner one of said alternate layers of each of said two resilient means being connected to one of said two surfaces of said wedge and an outer one of said alternate layers being connected to said outer member, said rigid plates of each of said two resilient means being disposed in parallel to one of said two surfaces of said wedge;

said inner member having two elastomeric parts on said wedge, each of said two elastomeric parts of said inner member being compressed between said wedge and said outer member to limit movement of said inner member relative to said outer member in a direction which is parallel to said two surfaces of said wedge and perpendicular to said axis,

said outer member having a tubular section having two open ends and said inner member having two axially spaced end members spaced from said two open ends of said tubular section and two elastomeric parts fixed to said end members, respectively, to limit movement of said inner member relative to said outer member in a direction along said axis.

4,032,126

SHOCK ABSORBING APPARATUS

William N. Laughlin, deceased, late of Lafayette, La., and by Thomas L. Hollis, executor, P.O. Box 51422, O.C.S., Lafayette, La. 70501

Filed Mar. 29, 1976, Ser. No. 671,600

Int. Cl.² B61G 9/16; E02B 3/22

U.S. Cl. 267—116 **26 Claims**

1. A shock absorbing apparatus comprising:

a casing;

an end wall for closing an end of the casing;

a piston movably disposed within said casing;

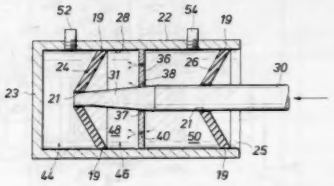
a first resilient seal attached to said piston and to an interior wall of said casing and cooperable with said end wall and a first portion of said casing to define a first closed chamber;

a second resilient seal attached to said piston and to the interior wall of said casing and cooperable with a second portion of said casing and said first resilient means to define a second closed chamber;

a baffle attached to the interior wall of said casing in said second closed chamber and comprising an interior edge defining an aperture through which said piston passes without coming into contact with said baffle, said baffle being operable to generally divide said second chamber into a first zone and a second zone;

a first port for introducing a compressible fluid into said first closed chamber;

a second port for introducing a relatively incompressible fluid into said second closed chamber;



said first resilient seal being operable to affect a compression of said compressible fluid when impact displaces said piston axially towards said first closed chamber;

said first and said second resilient seals being cooperable to affect a displacement of said relatively incompressible fluid from said first zone to said second zone when an impact displaces said piston axially towards said first closed chamber.

4,032,127

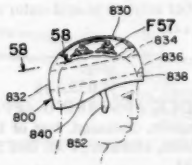
PROTECTIVE HEAD GEAR AND BODY EQUIPMENT

Donald Ernest Lipfert, Woolwich, Maine, assignor to Deres Development Corporation, Greenwich, Conn.

Continuation-in-part of Ser. Nos. 75,373, Sept. 25, 1970, Pat. No. 3,790,150, and Ser. No. 347,069, April 2, 1973. This application Feb. 4, 1974, Ser. No. 439,590

Int. Cl.² F16F 1/16

U.S. Cl. 267—151 **14 Claims**



1. A cushioning system for a protective head gear, body pad, guard, or the like, comprising a plurality of displaceable bearing means, particular ones of said bearing means being interconnected to others of said bearing means by a first lever type arrangement, so as to define a grouping of bearing means, said first lever type arrangement being operative upon displacement of one of said bearing means in a first direction to apply a force to another of said bearing means in an opposite direction, said bearing means and connected levers being mounted on structure or frame means formed to cover a selected body portion in which selected groupings of interconnected bearing means are further interconnected to other groupings of interconnected bearing means by a second lever type arrangement.

4,032,128

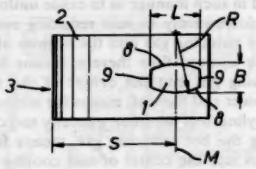
PIVOTAL BEARING FOR AN OMEGA SPRING

Holger Nicolaisen, Nordborg, and Leif Borge Tandrup, Sonderborg, both of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Oct. 16, 1975, Ser. No. 616,570

Int. Cl.² F16F 1/28

U.S. Cl. 267—159 **8 Claims**



1. An omega spring assembly comprising a bearing element, a generally U-shaped member having one leg with an elongated aperture therein having two arcuately shaped edges in mutually concave relation to each other, said edges being spaced apart a predetermined distance, said bearing element having a girth dimension larger than said predetermined distance and an adjacent tapered portion engaging said edges in load supporting relation thereto.

4,032,129

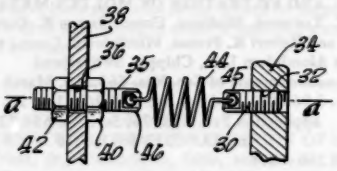
ADJUSTABLE TENSION SPRING ANCHOR

Karl H. Larsson, 433 Granite Ave., Monrovia, Calif. 91016

Filed Apr. 26, 1976, Ser. No. 680,181

Int. Cl.² F16F 1/12

U.S. Cl. 267—179 **8 Claims**



1. An adjustable tension spring anchor in combination with a tension spring, wherein the anchor is arranged for mounting in both a fixed and a movable structure, said anchor comprising:

an elongated cylindrical body member;

an adjustable securing means disposed along said body member, wherein said adjustable securing means comprises a threaded surface formed throughout the cylindrical body portion thereof, wherein the tension of said spring is adjustable to a predetermined condition;

a mounting head having an aperture disposed therein to receive one end of the tension spring, and formed as an integral part of said cylindrical body member.

4,032,130

DEVICE FOR ASSEMBLING PICTURE FRAMES

James R. Huntley, and William Franklin Southard, both of Monroe, N.C., assignors to Tool Service Engineering Company, Monroe, N.C.

Filed Jan. 14, 1976, Ser. No. 649,016

Int. Cl.² B25B 11/00

U.S. Cl. 269—8 **10 Claims**

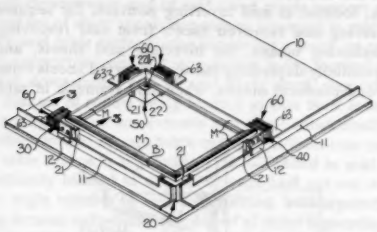
1. Apparatus to facilitate the assembly and gluing of pieces of mitered-end picture frame molding to form a picture frame therefrom, said apparatus comprising

a base member,

a plurality of corner blocks, one for each corner of the picture frame,

each of said corner blocks being carried by said base member and having surface portions thereon adapted for receiving and engaging the abutting end portions of a pair of the pieces of molding forming one corner of the picture frame,

means associated with one of said corner blocks for maintaining the corner block at a predetermined location on



said base member whereby the corner block serves to facilitate assembling the initial corner of the picture frame, and

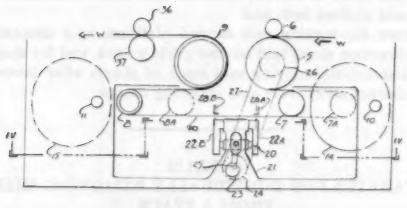
permanent magnet means cooperating with each of the remaining corner blocks for securing the same to the base member so as to permit adjusting the position of the corner blocks in accordance with the lengths of the pieces of molding to thereby facilitate assembling the remaining corners of the picture frame.

4,032,131

METHOD AND MEANS FOR FABRICATING MAGAZINES

William F. Davis, P.O. Box 179, Hightstown, N.J. 08520

Filed May 15, 1974, Ser. No. 470,141
Int. Cl.² B42B *2/00*
U.S. Cl. 270—53 **18 Claims**



1. A method of processing a plurality of webs to produce multileaf products wherein said method comprises the steps of:

First, continuously driving at least two webs of material from supply sources thereof to a recipient of said web material

Second, collating and registering each of said webs with each other

Third, guiding said webs in an excursion to and thru a processing location intermediate of said supply sources and said recipient of said webs under substantially uniform tension wherein said webs excursion has at least one bight before said processing location and after said collation of all of said webs

Fourth, stopping a portion of said webs at a periodic rate correlated to the driven speed of said webs and maintaining each of said webs in said portion of webs in register with each other at said processing location with places to be processed on said webs in alignment with processing means at said location

Fifth, processing said stopped portion of said webs in at least one place

Sixth, returning said stopped portion of said webs to web driving speed after said processing

Seventh, guiding said processed webs from said processing location to said recipient of said webs thru an excursion having at least one bight after said processing location

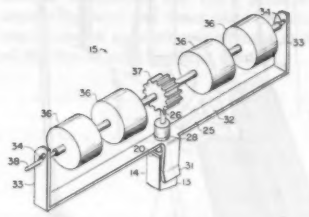
Eighth, severing said processed portion of said webs from said webs in predetermined locations with respect to said processed places on said webs thereby producing multileaf products.

4,032,132

COLLATOR ARM FEED HEAD

Frank J. Mignano, 293 8th St., Brooklyn, N.Y. 11215

Continuation-in-part of Ser. No. 632,511, Nov. 17, 1975, abandoned. This application July 28, 1976, Ser. No. 709,549
Int. Cl.² B65H *39/05*
U.S. Cl. 270—58 **10 Claims**



1. In a collating machine having paper bins with papers therein to be collated, paper ejection arms reciprocating with ejection and return strokes over said bins, feed heads on said arms moving the uppermost sheet in each bin on ejection strokes of said arms, and a system collecting uppermost moved sheets from said bins, the improvement comprising, in combination, a collator feed head on each of said arms, each of said feed heads having a bracket attached to one of said arms, projections of said bracket containing slots extending generally in the direction of the ejection strokes of said arms, a shaft journalled in said slots, rollers mounted on said shaft, a rachet wheel mounted on said shaft, a pawl fixed to said bracket adjacent to said rachet wheel, said pawl being disposed in the direction of return strokes of said arms, said rollers contacting the uppermost sheet of papers in said bin therebelow so that, on ejection strokes of said arms, said shaft moves in said slots engaging said rachet wheel with said pawl locking said rollers to move an uppermost sheet and, on collection of uppermost sheets and on return strokes of said arms, said shaft moves in said slots disengaging said rachet wheel from said pawl enabling said rollers to freely roll on papers thereunder, and electrical contact means associated with said shaft indicating movement of said shaft in said slots and thereby the collection of an uppermost moved sheet of paper from each of said bins.

4,032,133

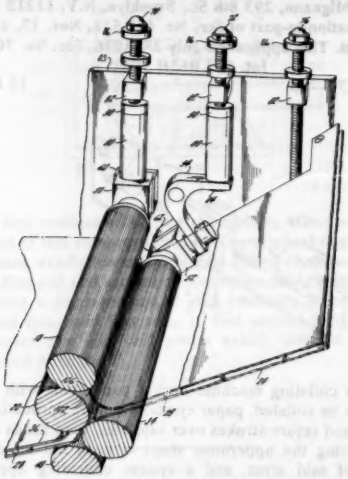
ROLLER POSITIONING METHOD AND APPARATUS FOR BUCKLE-TYPE PAPER FOLDING MACHINE

Charles J. Steffens, and Scott D. Steffens, both of 1855 Techny Road, Northbrook, Ill. 60062

Filed Sept. 11, 1975, Ser. No. 612,489
Int. Cl.² B65H *45/14*
U.S. Cl. 270—68 A **2 Claims**

1. A buckle-type folding machine for successively folding sheets of paper comprising a frame, first and second elongated rollers disposed in parallel relation defining a nip through which paper sheets can be successively passed and folded, means for supporting said first roller for rotational movement about its axis, means for rotably driving said rollers, an elongated fold plate having a paper receiving cavity into which

said sheets are directed for buckling said sheets prior to folding, said fold plate having a leading edge in close proximity to said second roller said fold plate being disposed at an acute angle to a line passing through the centers of said rollers, means for supporting said second roller for rotational movement about its axis as well as limited lateral movement relative to said frame in a direction perpendicular to its axis and parallel to said fold plate, said second roller supporting means including a pair of bearing blocks between which the ends of said second roller are rotably journaled, a pair of channels fixed to said frame, said bearing blocks each being slidably disposed within a respective one of said channels, said channels being mounted in a plane parallel to said fold plate so that



upon passage of a folded sheet through said nip said second roller separates from said first roller through non-radial movement in a direction parallel to the plan of said elongated fold plate to allow passage of said sheets while not substantially changing the spacing between said second roller and said fold plate leading edge, a pair of rockers pivotedly mounted on said frame and having first and second legs, means coupling the first leg of each rocker to one of said bearing blocks so that lateral movement of said bearing blocks within said channel upon passage of said folded sheets through said nip causes rotational movement of said rockers, and bias means acting on the second leg of each said rocker for urging said rockers, bearing blocks, and second roller to their original positions following passage of a folded sheet through said nip.

4,032,134

SHEET TURNING MACHINE

Juan Salvat Dalmau, Barcelona, Spain, assignor to Salvat Editores, S.A., Barcelona, Spain

Filed Dec. 10, 1975, Ser. No. 639,609

Claims priority, application Spain, June 12, 1974, 203898

Int. Cl.² B65H *3/10, 29/24*

U.S. Cl. 271—5 **3 Claims**

1. A machine for inverting or turning over material in sheet form, said machine comprising:

a chassis;

first substantially vertical guide means supported by said chassis;

first platform means, guided for movement along said first guide means, for supporting a stack of sheets to be inverted;

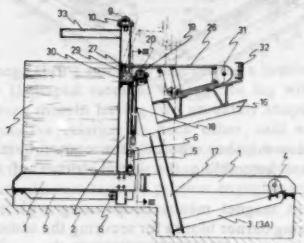
a frame pivoted to said chassis, said frame supporting second guide means, said frame being pivotable from a first position whereat said second guide means is inclined to the vertical to a second position whereat said second guide means is substantially vertical;

second platform means, guided for movement along said second guide means, for supporting said stack of sheets after they have been inverted;

means for moving said first platform means in an ascending direction along said first guide means, and for thereby sequentially moving said stack of sheets to a removal position located above said first platform means;

means, located at said removal position, for sequentially removing the topmost sheet from said stack of sheets and transferring the thus removed sheets to an inverting position located above said second platform means;

means, located at said inverting position, for sequentially receiving said removed sheets from said removing and transferring means, for inverting said sheets, and for sequentially depositing the thus inverted sheets onto said second platform means, when said frame is in said first



position thereof, said receiving, inverting and depositing means comprising an endless belt having an upper substantially horizontal run for receiving said sheets from said removing and transferring means and a lower run directed substantially perpendicularly to said second guide means when said frame is in said first position thereof, a roller about which said endless belt passes between said upper and lower runs thereof to invert said sheets, and air generator means for directing a jet of air toward a sheet on said endless belt and passing around said roller to thereby maintain said sheet in contact with said endless belt; and

means for moving said second platform in a descending direction along said second guide means, and for thereby sequentially moving said stack of sheets after inversion thereof away from said inverting means.

4,032,135

APPARATUS FOR INDIVIDUALLY REMOVING SHEETS FROM A STACK

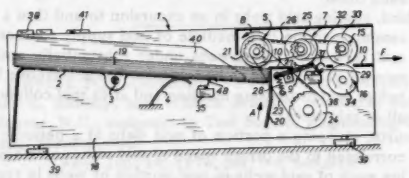
Kurt Rüenzi, Kusnachterstrasse 59, 8126 Zumikon, Switzerland

Filed Apr. 8, 1976, Ser. No. 674,918

Claims priority, application Switzerland, Apr. 15, 1975, 4758/75

Int. Cl.² B65H *3/06*

U.S. Cl. 271—116 **14 Claims**



1. An apparatus for removing individual sheets from a stack regardless of sheet thickness, comprising a housing, sheet stack support means having a downstream end, journal means supporting said sheet stack support means in said housing in

see-saw fashion, and sheet separating roller means comprising a first set of sheet separating rollers including a first shaft rotatably supported in said housing, said first set of rollers being drivably secured to said first shaft, said first shaft supporting said first set of rollers above said downstream end of said sheet stack support means, spring means in said housing arranged to urge the downstream end of said sheet stack support means toward said first set of rollers, power drive means for rotating said first set of rollers at a given speed, table means having a surface arranged substantially adjacent to said downstream end of said sheet stack support means, a second set of sheet separating rollers arranged in said housing above said table surface, stop means for a stack on said sheet stack support means, said stop means being located adjacent to said downstream end of said sheet stack support means, said first set of rollers being located so that their lowest sheet contacting surface line extends in a plane substantially corresponding to that of said table surface, at least one cut-out in said table means, a separating gate journalled in said housing a resiliently biassed to extend through said cut-out at an oblique angle relative to said table means, said separating gate being located below said second set of sheet separating rollers with its highest point above said table surface, and friction increasing cover means on said separating gate, said friction increasing cover means facing said second set of sheet separating rollers, said first set of sheet separating rollers comprising free wheeling overtake rollers, said apparatus further comprising means for driving the second set of sheet separating rollers faster than the first set of sheet separating rollers when said first set of sheet separating rollers are driven at said given speed.

4,032,136

FEED CASSETTE

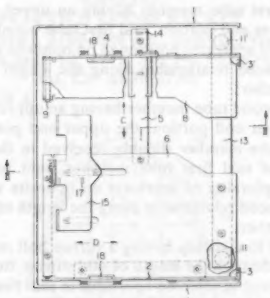
Shiro Komaba, and Yoshitomo Goshima, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 454,843, March 26, 1974, abandoned. This application Sept. 11, 1975, Ser. No. 612,479

Claims priority, application Japan, Apr. 6, 1973, 48-39246

Int. Cl.² B65H *1/12, 3/56*

U.S. Cl. 271—160 **6 Claims**



1. A feed cassette for sheets of copy material comprising:

a cassette body having a feeding end past which copy material moves as it is fed from the cassette;

two side plates mounted on said body, at least one of which is movable along said body toward and away from the other side plate to accommodate different sizes of copy material therebetween;

two vertically movable separating pawls for separating the copy material as it is fed, said separating pawls being connected to said side plates for respectively engaging opposite corners of the copy material at the leading edge thereof adjacent to said feeding end of said body;

inner plate means positioned between said side plates for supporting the copy material, said inner plate means including a plurality of inner plates, wherein said inner plates have ends disposed adjacent said feed end of said body, and extend rearwardly to support the copy material;

means connecting one of said inner plates to said movable side plate for movement therewith in the direction of movement of said movable side plate while permitting said one inner plate to move independently with respect to said movable side plate in a vertical direction;

means for mounting the remainder of said plurality of inner plates within said cassette to permit vertical movement of said inner plates;

means mounted within said cassette for urging said ends of said inner plates upwardly, to thereby urge the leading edge of the uppermost sheet of copy material against said separating pawls; and

means for maintaining said ends of said inner plates at substantially the same relative height;

whereby, when said movable side plate is moved to accommodate a different size copy material, the associated separating pawl and inner plate are also moved so that copy material separation is effected uniformly regardless of the size of copy material used.

4,032,137

FEED CASSETTE DEVICE

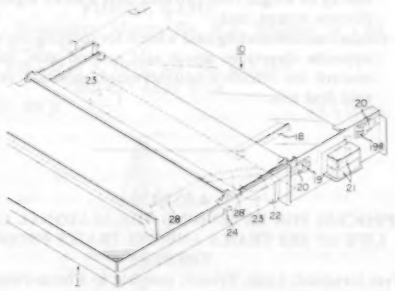
Hajime Katayama; Hiroshi Nitanda; Tateki Nagaoka, all of Tokyo; Hirotoshi Kishi, Higashi Murayama; Yousaku Takada, Tokyo; Noriyoshi Iida, Ichikawa; Tsuneki Inuzuka, Fuchu, and Yutaka Komiya, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 624,183

Claims priority, application Japan, Oct. 22, 1974, 49-121823; Dec. 5, 1974, 49-147626[U]; Dec. 5, 1974, 49-147627[U]

Int. Cl.² B65H *1/04*

U.S. Cl. 271—164 **8 Claims**



1. A feed cassette device for a copying machine comprising:

a cassette having side plates, and having a bottom plate connecting the side plates, for storing copy mediums therein, said bottom plate having a guide member projecting downwardly therefrom for use in aligning said cassette on said machine;

a cassette table for receiving said cassette thereon, said cassette table having a positioning member and a member for contacting one of said side plates to urge said cassette guide member into engagement with said positioning member to properly align said cassette on said table; and

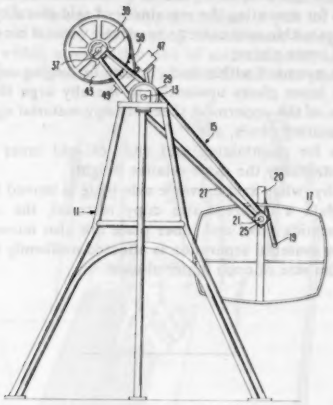
lock means for locking said cassette in a predetermined position on said cassette table.

4,032,138

ADJUSTABLE POSITION COUNTERWEIGHT ASSEMBLY FOR AMUSEMENT RIDE

David Barry Willis, Palo Alto, Calif., assignor to Arrow Development Co., Inc., Mountain View, Calif.

Filed June 28, 1976, Ser. No. 700,397
Int. Cl.[2] A63G *1/12*
U.S. Cl. 272—33 R 8 Claims



1. In an amusement ride wherein an elongated support arm is pivotably held at an axis intermediate of its ends by a stationary frame, means being attached to the support arm on one side of this axis for carrying one or more passengers and means being attached to the support arm on the other side of the pivot axis for providing a weight to counter that of the passengers and the passenger carrying means, an improved counterweight assembly that is adjustable in position to compensate for varying passenger weight that can be carried by the passenger carrying means, comprising:

a pair of wheels held by said other side of the support arm for independent rotation about a second axis that is parallel to said first axis, each of said wheels being unbalanced in substantially the same manner by having a major portion of its weight concentrated over a small segment of its circular extent, and

means interconnecting said wheels for rotating the wheels in opposite directions about said second axis, thereby to control the effective counterweight position relative to said first axis.

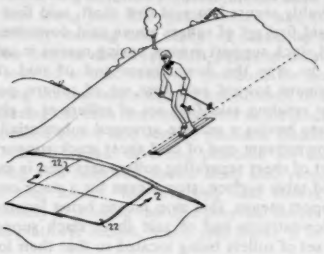
4,032,139

PROCESS FOR EXTENDING THE SEASONAL USEFUL LIFE OF SKI TRAILS AND SKI TRAILS PRODUCED THEREBY

Yves Gaudard, Lyon, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Apr. 26, 1972, Ser. No. 247,638
Claims priority, application France, May 3, 1971, 71.16118
Int. Cl.[2] A63B *69/18;* A63G *21/02*
U.S. Cl. 272—56.5 SS 3 Claims

1. A process for extending the period over which fallen natural snow will remain on sloping terrain and during which said sloping terrain can be utilized for skiing comprising the step of covering a sloping terrain with an elongate non-woven fabric support material formed of synthetic continuous filaments wherein said non-woven fabric is a needled, spunbonded fabric of polyethylene terephthalate prior to a snow fall such that a layer of snow collects on the non-woven fabric support material, the length of the non-woven fabric support material running along the sloping direction of the terrain to define a ski trail to thereby extend the period prior to melting of fallen natural snow, and accordingly, extend the seasonal



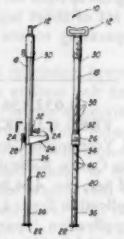
period during which a sloping terrain may be utilized for skiing with natural snow.

4,032,140

ADJUSTABLE STILT

Melvin R. Davis, 810 Toh-n-hah Trail, Wichita, Kans. 67212, and Roy G. Howe, Jr., 310 Champa, Pratt, Kans. 67124

Filed Mar. 29, 1976, Ser. No. 671,134
Int. Cl.[2] A63B *25/00*
U.S. Cl. 272—70.1 7 Claims



1. An adjustable stilt for walking on, the stilt comprising:

a vertical first tube member having an upper end portion and a lower end portion, said first tube member having a plurality of apertures positioned on opposite sides thereof and is spaced relationship along the length of said first tube member;

a vertical second tube member having an upper end portion and a lower end portion, the upper end portion of said second tube member slidably received in the lower end portion of said first tube member, said tube member having a plurality of apertures on opposite sides thereof and in spaced relationship along the length of said second tube member;

a horizontal foot stirrup having a stirrup bolt received in an aperture through the length of said stirrup, the end of said bolt received in selected apertures in said first tube member and said second tube member and therethrough, the end of said bolt attached to a locking nut for securing said tube members to each other and to said foot stirrup; and

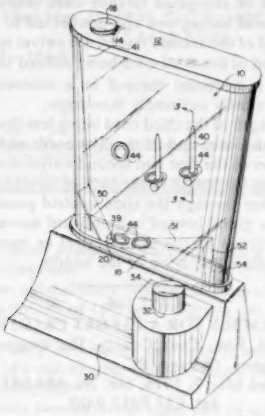
a handle having a hollow collar integrally formed therein, said collar receiving the upper end portion of said first tube member and attached thereto by a handle bolt and a locking nut, said handle having a plurality of apertures on opposite sides of said collar and in a spaced relationship along the length thereof, said handle being adjustable on the upper end portion of said first tube member by indexing the apertures in said collar with the apertures in the upper end portion of said first tube member;

the length of the stilt being adjustable by properly indexing the apertures in said first tube member with the apertures in said second tube members when said first tube member is raised or lowered with respect to said second tube member positioned therein.

4,032,141
AMUSEMENT DEVICE

Tomihiro Tanimura, No. 9-10, Tateishi, Katsushika, Tokyo, Japan

Filed Mar. 9, 1976, Ser. No. 665,323
Claims priority, application Japan, Oct. 29, 1975, 50-147259[U]
Int. Cl.² A63F 9/00
U.S. Cl. 273—1 L 14 Claims

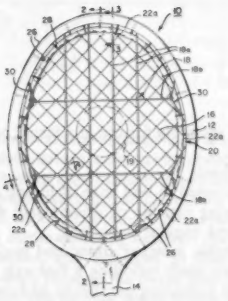


1. An amusement device, comprising a transparent enclosure for containing a liquid, at least one object within said enclosure having a specific gravity greater than the specific gravity of the liquid, target means within said enclosure for holding said object, pump means connected to the interior of said enclosure for transmitting liquid into said enclosure to generate currents within the liquid to cause said object to move within said enclosure sure towards said target means.

4,032,142
PRACTICE TENNIS RACKET

Robert M. Andrews, 3100-80th NE., Bellevue, Wash. 98004

Filed Sept. 12, 1975, Ser. No. 612,934
Int. Cl.² A63B 61/00
U.S. Cl. 273—29 A 13 Claims



1. A practice racket for a game such as tennis, by which a player executes a stroke against a game ball in a manner similar to a stroke executed with a conventional game racket in actual game play, while retaining the ball in the practice racket, said practice racket comprising:

a. a handle adapted to be grasped by the player to execute a stroke,

b. a peripheral frame attached to the handle and defining therewithin the perimeter of an impact area generally in a plane occupied by the frame, said impact area corresponding to an area in the game racket where the ball is normally struck in game play,

c. a flexible net means mounted to the frame and extending across said impact area, said net means being arranged to deflect at least moderately from the plane of the impact area upon engagement with a ball, and

d. retaining string means connected to said frame and extending across said impact area, said string means being sufficiently yielding to permit the ball to pass therethrough and into the net means when the ball is engaged with the practice racket at said impact area, and said string means having sufficient tension to cooperate with the net means to form a retaining pocket to hold the ball in the net means after the ball has passed through the string means.

4,032,143
COMPOSITE BASEBALL BAT

Alvin W. Mueller, St. Louis, Mo.; Robert J. Williams, Chicago, and Robert E. Ansel, Hoffman Estates, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

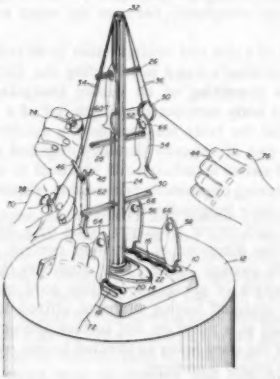
Filed Sept. 29, 1975, Ser. No. 617,439
Int. Cl.² A63B 59/06
U.S. Cl. 273—72 R 12 Claims

1. A baseball bat comprising a tubular, high yield strength aluminum core extending almost the full length of the bat, said core having a diameter of from three-fourths to 1 inch and a wall thickness of from 0.62 to 0.125 inch, said tubular core having adhered to its entire outer surface a foam plastic body having a density of from 30–50 pounds per cubic foot and an integral outer skin, said aluminum having a yield strength of at least 30,000 p.s.i.

4,032,144
FISHING GAME

Matthew A. Moustakas, Mercerville, N.J., assignor to CBS Inc., New York, N.Y.

Filed May 3, 1976, Ser. No. 682,209
Int. Cl.² A63F 9/14
U.S. Cl. 273—86 R 10 Claims



1. Game apparatus comprising, in combination:

a base member adapted to be supported on an underlying

surface and having at least one elongated slot formed in the upper surface thereof,

an elongated member vertically supported on said base member, said vertical member having at least one cross-arm extending outwardly therefrom,

a pair of lines each tethered at one end to the upper end of said vertical member and each having a handgrip attached to the other end,

an annular ring member through which both lines of said pair extend, said ring member having a hook secured thereto, and

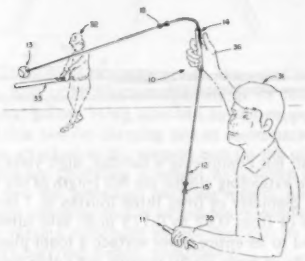
at least one game piece having an aperture therethrough sufficiently large to receive at the same time said hook and said crossarm, said game piece being removably supported in said slot in a position to be engaged by said hook and adapted to be moved with said ring member along said pair of lines by separation and convergence of said lines.

4,032,145

ACTION BATTER UP GAME APPARATUS

Max M. Tami, 1769 Pine St., Napa, Calif. 94558

Filed Sept. 24, 1975, Ser. No. 616,141
Int. Cl.² A63B 67/10
U.S. Cl. 273—90 **1 Claim**



1. An action batter up game apparatus comprising, in combination:

a spherical baseball;

a slide control of a size and configuration to be readily grasped in an individual's hand, the slide control consisting of an axially elongated cylindrically shaped body member having an open top end, an open bottom end, cylindrical sidewalls, and an axially elongated passageway extending longitudinally therethrough completely between the open top and bottom ends;

a handle of a size and configuration to be readily grasped in an individual's hand not holding the slide control, the handle consisting of an axially elongated cylindrically shaped body member manufactured of a flexible plastic material the body member having cylindrical side walls and a pair of opposite parallely disposed ends;

a pair of swivel members each identical to each other with each having opposite ends rotatable relative to each other about their longitudinal axis;

each of said swivel members being of a diameter greater than the diameter of the slide control passageway to prevent passage of the swivel members therethrough;

a first length of elongated flexible cord manufactured of nylon material having one end affixed to the spherical baseball at a point on the surface thereof, the opposite end of the cord being connected to one end of a first one of the swivel members;

a second length of elongated flexible cord manufactured of nylon material having opposite ends and having a diameter less than the diameter of the slide control passageway so as to be freely slidable therethrough;

one end of the second cord being connected to the remaining free end of the first one of the swivel members with the opposite end of the second cord being passed freely through the slide control passageway through its open top end and out of its open bottom end, the opposite end of the second cord then being connected to one end of a second one of the swivel members;

the longitudinal overall length of the first cord being greater than the length of the second cord;

a third length of elongated flexible cord manufactured of nylon material having one end connected to the remaining free end of the second one of the swivel members, the opposite end of the third cord being affixed to the flexible handle at a midpoint thereof in a manner projecting generally radially outwardly therefrom;

the overall length of the third cord being less than the length of the second cord and of the first cord; and

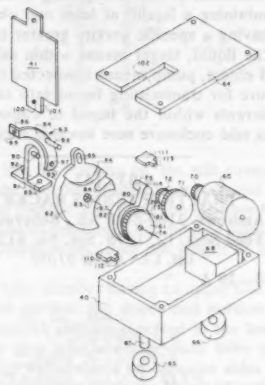
the disposition of the first and second swivel members serving to define the length of the path of travel of the second cord member through the slide control passageway thus limiting the radial inward and outward movement of the baseball relative to the slide control as manipulated by the individual's operation of the handle.

4,032,146

TARGET ASSEMBLY FOR A TARGET PRACTICE RANGE

Raymond W. H. Kim, Cook County, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed May 7, 1976, Ser. No. 684,043
Int. Cl.² F41J 9/00
U.S. Cl. 273—105.6 **6 Claims**



1. A target assembly for use in a target practice range comprising:

a carriage base;

a motor mounted in said base including a driven shaft, said motor being capable of driving said driven shaft in first and second angular directions;

a first rotatable member connected in driven relation with said driven shaft including a first axis of rotation and an extension extending parallel to and radially spaced from said first axis, said extension being arcuately displaceable between a first position and a second position about said first axis with rotation of said rotatable member;

a second rotatable member having a second axis of rotation and including a generally radial slot extending from the periphery of said second member towards said second axis and dimensioned for receiving said extension of said first rotatable member, said first rotatable member and said second rotatable member being arranged relative to one another for aligning said slot with said extension; and

a target forming member coupled to said second rotatable member and displaceable by said second rotatable member between a vertical position and a horizontal position as said second rotatable member is rotated under the influence of said extension within said slot.

4,032,147
COMPOSITE DART BODY

Walter M. Sheldon, Jr., Deerfield, Ill., assignor to Fansteel Inc., North Chicago, Ill.

Filed May 17, 1976, Ser. No. 687,168
Int. Cl.² A63B 65/02
U.S. Cl. 273—106.5 R 10 Claims

1. An improved composite dart body for a hand throwing dart which comprises:

a. a slender, substantially cylindrical, central, metallic body having a density of 18.5 to 19.3 grams per cubic centimeter,

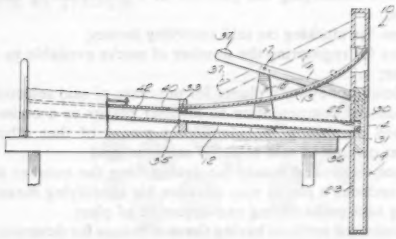
b. a front body bonded to one end of said central body formed of a machinable metal having a recess to receive a dart point, and

c. a rear body bonded to the other end of said central body formed of a machinable metal having a recess to receive a fletching assembly.

4,032,148
GAME APPARATUS

Richard E. Sanders, B. P. 10, Doba, Chad, Africa

Filed Sept. 18, 1975, Ser. No. 614,563
Int. Cl.² A63D 3/02
U.S. Cl. 273—120 R 6 Claims

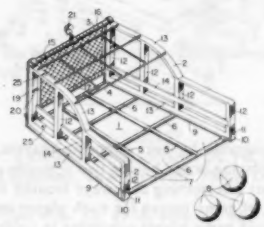


1. In an improved elevator associated with a gameboard, a hollow upright standard having walls sized to contain spherical playing pieces and having upper and lower ends, a rod slideably mounted within said standard, and inlet hole on the lower part of the standard, an outlet hole on the upper part of the standard, said holes communicating between the interior and exterior of the standard, and arranged so that the playing piece leaves the standard through the outlet hole transverse to the direction in which the playing piece enters the standard through the inlet hole, a fixed planar lifting surface formed in the rod, said lifting surface being inclined obliquely to slope both toward the outlet hole and away from the inlet hole, the inclination of the surface being in a direction between the orientation of the inlet hole and the orientation of the outlet hole, said surface cooperating with two of said walls to form a channel to admit a piece from the inlet hole in a first direction and cooperating with another said wall to form a channel to discharge a piece from the outlet hole in a second direction, and means for sliding said rod in said standard from a lower position in which the lifting surface is aligned with the lower edge of the inlet hole to an upper position in which the lifting surface is aligned with the lower edge of the outlet hole.

4,032,149
TARGET GAME FOR ROLLING MISSILE

Delbert B. Lansberry, 211 S. Trask St., Hillsbourgh, Fla. 33609

Filed Oct. 10, 1975, Ser. No. 621,377
Int. Cl.² A63F 7/00
U.S. Cl. 273—123 R 4 Claims

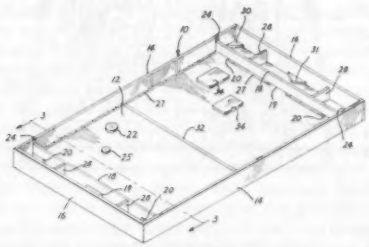


1. In combination, a target game comprising missiles and a partially enclosed target element; said target element having netted rear gate means; upstanding side frame members, each defined by a plurality of vertical posts connected by upper and lower beams and an intermediate bumper bar; a horizontally disposed scoring grid defined by a plurality of longitudinal and latitudinal ribs arranged to form open scoring sectors and integrally affixed to said side frame members; and a top web member attached to a portion of said side frame members, whereby said target element has a forward unobstructed portion for receiving said missiles when launched by a player.

4,032,150
PADDLE AND PUCK GAME EQUIPMENT

David C. Wilson, 35 Manor Loop, Roseburg, Oreg. 97470

Filed May 14, 1975, Ser. No. 577,329
Int. Cl.² A63F 3/00
U.S. Cl. 273—126 R 6 Claims

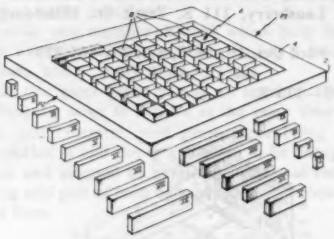


1. Playing equipment for a puck and paddle game comprising, the combinations with a puck and hand held playing paddles of an open tray which includes upstanding side and end wall members, a floor member that provides a playing surface divided into courts by a center line, and goal strips at opposite ends of the tray having scoring slots through any one of which the puck may be driven, said side walls having pairs of transversely aligned vertical slots in which the ends of the respective goal strips may be slidably and removably contained, the lower margins of the side walls and the goal strips being coated with a covering of rubbery material to increase the rebounding liveliness of said members while deadening the sound producing by the playing of the game.

4,032,151
GAME BOARD APPARATUS

Harold F. Morse, 1765 Gilpin St., Denver, Colo. 80218

Filed June 10, 1976, Ser. No. 694,724
Int. Cl.² A63F 3/00
U.S. Cl. 273—131 B 8 Claims

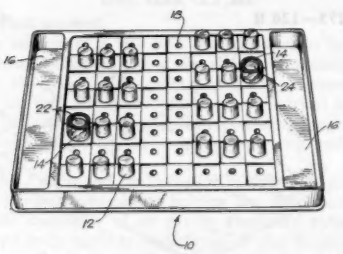


1. A game playable by two opposing players, said game consisting of a playing board having two opposite playing sides and spaced apart intersecting slideways located between said sides, and a set of game pieces for each player engageable in the slideways, said game pieces occurring in uniformly graduated lengths, and game pieces of each graduated set differing in length progressively one from another by a unit dimension corresponding to the width of one of the slideways, differing combinations of pieces for each set being combinable on the board in abutting relationship by a player to extend from one of the playing sides to the other playing side to constitute a game-winning placement of pieces.

4,032,152
BOARD GAME

Edward J. Schifman, Nashville, Tenn., assignor to Aladdin Industries, Incorporated, Nashville, Tenn.

Filed Jan. 23, 1976, Ser. No. 651,948
Int. Cl.² A63F 3/02
U.S. Cl. 273—131 BA 6 Claims



1. A board game for competition between two players comprising

a. a playing surface having an eight by eight array of playing squares including an aperture through the surface provided at the center of each square,

b. two sets of pegs, each set of a different color, each peg including an extension depending downwardly therefrom and dimensioned to be received in said apertures to prevent sliding movement of said pegs on said playing surface.

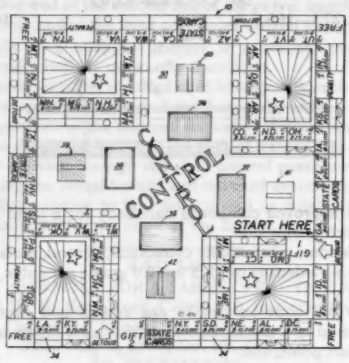
c. key marker means consisting of a single key marker for each set of pegs, said markers being cylinders having a hollow central portion of a dimension sufficient to be placed over said pegs,

whereby each player attempts to be first to move his key marker one square at a time from one side of the playing surface to the other side, occupying only squares which have pegs located thereon.

4,032,153
BOARD GAME ASSEMBLY

Daniel E. Daum, 977 Columbia Ave., Atlanta, Ga. 30309

Filed July 6, 1976, Ser. No. 702,622
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AT 10 Claims



1. A board game assembly for at least two players, comprising:

a. a board having thereon a plurality of juxtaposed sections forming a primary path of play about said board, other of said sections selectively interconnecting said primary path to form alternate playing paths, selected ones of said sections of said primary and alternate paths having means for receiving thereon a removable mark to signify the degree of control of said section by a player;

means for identifying the position of a player along said paths;

c. means for marking on said receiving means;

d. means for registering the number of marks available to a player;

e. artificial money for a player for purchase of said selected sections of compensation to another player as a consequence of placing the identifying means of that other player on one of said selected sections; and

f. chance-controlled means for determining the number of said sections a player may advance his identifying means along said paths during one sequence of play;

g. said selected sections having thereon means for determining the amount of money necessary for obtaining control of said selected sections; and

h. wherein certain of said selected sections have means thereon to indicate that a player controlling a preselected number of said selected sections receives extra compensation when the identifying means of another player is on one of said selected sections.

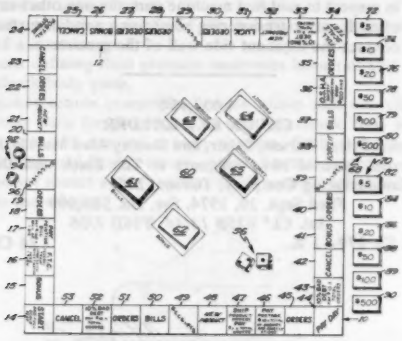
4,032,154
BOARD GAME APPARATUS

David L. Magiera, Hopkins, Minn., assignor to Wicks & Nemer, P.A., Minneapolis, Minn.

Filed July 8, 1974, Ser. No. 486,607
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 AT 2 Claims

1. Game board apparatus comprising, in combination: first means indicating limits for at least one type of game points, with the game points consisting of orders and cancellations; secon means adding and/or subtracting game points in a random manner; monetary tokens; third means adding or sub-

tracting from the balance of monetary notes in a random manner; a game board having locations arranged thereon forming a path, the locations including reward/penalty locations, major game object locations for directing the player to follow the instructions of the second means adding or subtracting game points, and minor game object locations for directing the player to follow the instructions of the third



means adding or subtracting from the balance of monetary notes; game markers for movement around the locations on the board; and chance taking apparatus for determining the movement of the game markers around the locations on the board during play, wherein a player tries to meet two separate game objects, where the first game object is determined by the first means and the second game object is to maintain a minimum balance of monetary tokens.

4,032,155

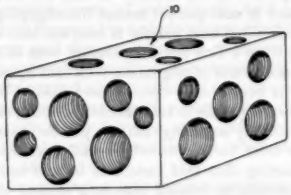
SPLIT BOLT AND BLOCK GAME

Wesley L. Thomas, 109 S. Catalina, Los Angeles, Calif. 90004

Filed Mar. 15, 1976, Ser. No. 666,623

Int. Cl.² A63F 9/08

U.S. Cl. 273—156 **4 Claims**



1. A toy or game comprising: a block having a plurality of tapped holes therein; and a plurality of split bolts, each comprising a plurality of parts adapted to be fitted together to provide a bolt of a size to be received in a corresponding one of the holes in the block.

4,032,156

ASSISTING ORIENTATION OF A MEMBER AS IT MOVES IN A LINEAR PATH

Trevor George Clarke, 6 Summercourt Drive, Ravenshead, Nottinghamshire, England

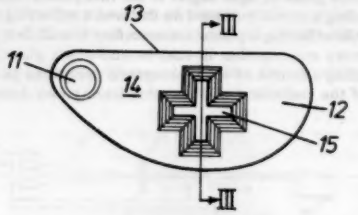
Filed Nov. 3, 1975, Ser. No. 628,316

Claims priority, application United Kingdom, Nov. 1, 1974, 47329/74

Int. Cl.² A63B 53/04

U.S. Cl. 273—164 **4 Claims**

1. A golf club head having a flat striking face and substantially flat top and bottom faces, the top face having internal walls defining an aperture in the top face and opening at the bottom face, said walls tapering towards each other so that the aperture reduces in lateral dimensions away from the top face, said walls including at least two walls inclined to each other in



the plane of the top face and also inclined to relatively perpendicular planes.

4,032,157

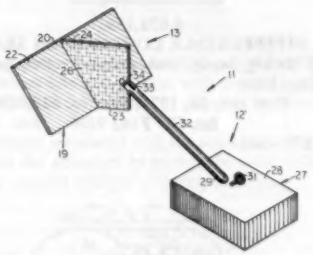
GOLFER'S TRAINING DEVICE

Walter M. Carpenter, 1825 W. 38th Place, Davenport, Iowa 52806

Filed Feb. 13, 1976, Ser. No. 657,913

Int. Cl.² A63B 69/36

U.S. Cl. 273—183 E **9 Claims**



1. A self-instruct golf swing analyzer for use by a golfer, said analyzer comprising:

a base means having a lower ground engageable portion and an upper portion; and

an indicator means for communicating to the golfer the body movement of the golfer during a golf swing, said indicator means being attached to said upper portion and including first and second planar indicator members, said second planar indicator member being affixed normal to said first planar indicator member intermediate the ends of said first planar indicator member, the opposite planar surfaces of said planar members including markings distinctly different from one another and detectable by a golfer from a golfing stance upon improper head and body movement during the execution of a golf club swing the golfer assuming a stance adjacent said base means and fixing his gaze upon said indicator members.

4,032,158

METHOD AND APPARATUS FOR INDICATING ANGULAR DISPLACEMENT

Colin Howard Stanwell-Smith, Cambridge; Dexter Robert Plummer, Ongar; Frederick James Easthope, Cambridge, and Jonathan Humfrey Pope, Fulbourn, all of England, assignors to Strathearn Audio Limited, Belfast, Ireland

Filed Sept. 3, 1975, Ser. No. 610,091

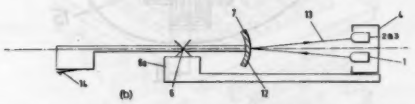
Claims priority, application United Kingdom, Sept. 5, 1974, 38850/74

Int. Cl.² G11B 3/10; G01D 5/30

U.S. Cl. 274—23 A **3 Claims**

1. In a phonograph having a pivoted pickup arm, apparatus

for use in providing a signal which indicates an angular displacement of the arm in a first plane from a desired axis, while not being influenced by an angular displacement of the arm in a second plane at right angles to the first plane, the apparatus including a mirror mounted on the arm, a reflecting surface of the mirror having a planar cross-section in said first plane and a convex cross-section in said second plane plane, a sensor including a source of electromagnetic radiations and a detector of the radiations said detector having two detecting ele-



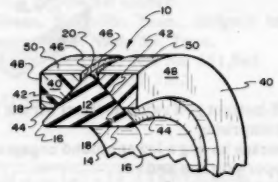
ments, with one element on either side of said second plane, each producing a signal which varies as a function of the amount of recieved radiation, means for mounting the said detector elements with respect to the mirror and the source that radiations from the source are reflected from the mirror to the detector elements, the relative amounts of radiation received by the respective elements being a function of the displacement of the arm from the desired axis, said first plane whereby the arm can be moved according to the output from the detector elements to correct any angular displacement.

4,032,159

INTERFERENCE COMPRESSION SEAL

Gordon T. Zitting, Sandy, Utah, assignor to Poly Seal, Inc., Salt Lake City, Utah

Filed Oct. 28, 1975, Ser. No. 626,589
Int. Cl.² F16J 9/06
U.S. Cl. 277—145 **2 Claims**



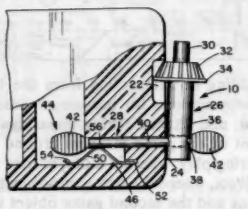
1. An interference compression seal assembly comprising:
first and second relatively displaceable machine parts;
a delta-shaped annular seal of deformable material having memory, said delta-shaped seal comprising three surfaces only, a base surface to engage substantially all of the base of a U-shaped groove in the first machine part and two convergent diagonal side surfaces merging at an apex, said seal further comprising three corners, one corner being disposed at the intersection of each two surfaces, two of the seal corners to be respectively disposed in the base corners and the third seal corner comprising the apex to deformingly engage the second machine part.
two generally triangularly shaped annular anti-extrusion rings having three major surfaces only and comprising hard rigid synthetic resinous material one of each of said ring surfaces being diagonally oriented between the other ring surfaces, the diagonal surface of the two rings respectively contiguously engaging substantially the entire length of the two diagonal surfaces of the delta-shaped seal, one of the other surfaces of each ring respectively engaging the opposed side walls of the groove and, the second of the other surfaces of each ring along their full length respectively engaging a common surface of a second machine part, the anti-extrusion rings being spaced from the base of the grooves and transmitting force to said groove base solely through diagonal side surfaces of the seal, the anti-extrusion rings constricting and compressing the delta-shaped seal inwardly and toward the second machine part when so placed in said groove, each of the two anti-extrusion rings being separate one from the other at said apex seal corner and each presenting at said second other ring surface an annular circumferential wear surface, to engage said common surface of the second machine part which experiences relative motion in respect to said first machine part, the one other surface of each anti-extrusion ring comprising a radial surface, to contact the adjacent side wall of the groove.

4,032,160

CHUCK KEY HOLDER

Alvydas Petras Karasa, Belair, and Stanley Alan Markle, Lutherville, both of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Filed Sept. 20, 1974, Ser. No. 508,009
Int. Cl.² B25B 13/44; F16D 1/06
U.S. Cl. 279—1 K **24 Claims**



9. In combination, a chuck key for a portable electric tool including a body having an elongated sliding handle slidable along and rotatable about a longitudinal axis of said handle relative to said body, paddle means at each end of said sliding handle; pocket means formed in a structure for mounting said chuck key on said structure, said pocket means comprising guiding means having an opening having a shape corresponding to the projection of said handle and said paddle means on a plane perpendicular to the axis of said handle; first corner means formed in said pocket means for engaging one of said paddle means when said handle is inserted into said opening and rotated from a first position aligned with said opening to a second position out of alignment with said opening whereby said handle is held in said opening and cannot be withdrawn from said opening while in said second position; second corner means for laterally engaging said one paddle means to prevent said handle from being rotated beyond said second position thereby ensuring that said handle is in said second position when said handle is rotated into said second position; and, cam locking means integral with said body for coacting with said other paddle means for tightly holding said handle between said first corner means and said body when said handle is rotated into said second position whereby said body is held against said structure.

4,032,161

POWER OPERATED CHUCK

John Richard Peden, Liphill Quay, Bere Ferrers, Devon, and Derek Vivian Ivor Santillo, 66 Elm Road, Mannamead, Plymouth PL4 7BB, both of England

Filed Apr. 4, 1975, Ser. No. 565,318
Claims priority, application United Kingdom, Apr. 5, 1974, 15371/74
Int. Cl.² B23B 31/30
U.S. Cl. 279—1 H **6 Claims**

1. In a power operated work holding chuck of the type having:
a chuck body,
radially movable jaws on the chuck body,

fluid pressure operated actuator means,

means linking said pressure operated actuator means to said jaws on said chuck body, whereby to transmit movement of said pressure operated actuator means to said jaws,

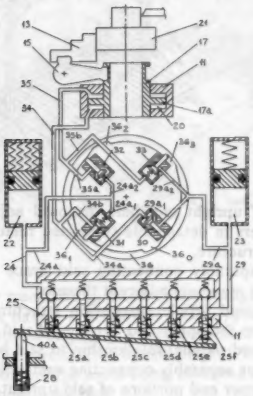
the improvement wherein:

said chuck body is formed in two parts which are secured together and rotatable with respect to one another, one of said chuck body parts housing said fluid pressure operated actuator means,

means mounting one of said chuck body parts on a spindle of a machine tool,

means defining fluid pressure reservoirs in one of said two chuck body parts,

a power source comprising means within said two chuck body parts for generating, as said two chuck body parts rotate with respect to one another, fluid pressure for driving said fluid pressure operated actuator means, said power source acting to pump fluid from one said reservoir to the other,



said fluid pressure generating means comprising a plurality of pumps operated by relative rotation of said two relatively rotatable parts of said chuck, said plurality of pumps being mounted in a circle on one of said two chuck body parts and having operating plungers associated therewith extending axially of the chuck bod,

a swash plate carried on the other of said two chuck body parts, said swash plate being pivotally mounted to turn about an axis which lies in a plane defined by the free ends of the plungers of said pumps when they are not depressed, and

resilient biasing means engaging said swash plate and urging it to a position in which it is inclined with respect to the said plane, said resilient biasing means permitting said swash plate to be displaced about said pivot thereof as the pressure delivered by said pumps increases until it lies substantially parallel to said plane defined by said free ends of said plungers.

4,032,162

MACHINE TOOL CHUCK

James D. Flinchbaugh, York, Pa., assignor to Weldon Hydraulics, Inc., York, Pa.

Filed July 26, 1976, Ser. No. 708,488

Int. Cl.² B23B *31/19, 31/30*

U.S. Cl. 279—4 **16 Claims**

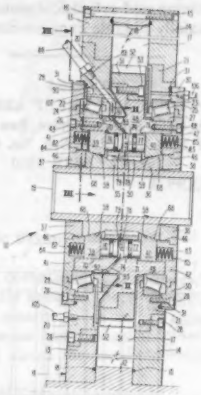
1. A chuck for machine tools for holding two work pieces, including

a. two separate, axially aligned hollow work holding elements, each element having capacity to contract diametrically to work clamping condition and to expand diametrically to work releasing condition,

b. a pair of annular, axially spaced actuators, each actuator being disposed externally of one of the work holding elements in telescopic relation thereto, and each actuator having capacity for axial movement relative to its work holding element,

c. two axially spaced annuli of pistons, each annulus comprising a plurality of angularly spaced pistons disposed adjacent to one of the actuators,

d. an annulus angularly spaced cylinders for containing the pistons, located intermediate the actuators,



e. actuating means for advancing the pistons of each annulus of pistons into engagement with their adjacent actuator, to advance the actuator to contract its work holding element, and

f. release means associated with the actuators and operative to retract the actuators to permit the work holding elements to expand to work releasing condition.

4,032,163

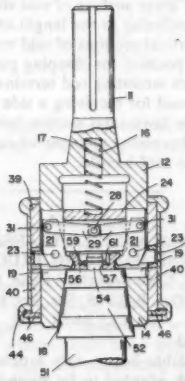
QUICK CHANGE IN-MOTION TOOL CHUCK

Donald G. Holt, 508 29th Ave., Oakland, Calif. 94601

Filed Jan. 26, 1976, Ser. No. 652,486

Int. Cl.² B23B *31/18*

U.S. Cl. 279—37 **11 Claims**



1. A tool chuck system for securing and removing a tool in a rotary machine during rotation thereof comprises a spindle adapted to be secured to the rotary machine, a barrel extending axially from said spindle, said barrel including a bore extending axially therein from the distal end thereof; an actuator member disposed about said barrel and slidably translat-

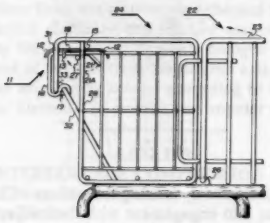
able thereon; a cylindrical member slidably disposed in the inner end of said bore; a first pair of opposed, diametrical slots disposed within said barrel; a pair of toggle members, each of said toggle members pivotally disposed in one of said first pair of slots; a pair of linking members, each of said linking members pivotally joined at one end to said cylindrical member and pivotally joined at the other end to one end of one said toggle members, said linking members being rotatable through a position perpendicular to said axis of said barrel to form a past center linking arrangement with said toggle members, and means for joining said cylindrical member and said actuator member in axially slidable engagement.

4,032,164

SHOPPING CART SHELF ASSEMBLY

Donald H. Frisch, 6759 Mineral Drive, San Diego, Calif. 92119

Filed June 25, 1976, Ser. No. 699,805
Int. Cl.² B62B *5/00*
U.S. Cl. 280—33.99 A **5 Claims**



1. On a shopping cart of the type utilized by customers in retail outlets, in which a substantially horizontally rectangular cross-sectioned marketbasket terminating in its upper back portion in a rigid horizontal crossbar member is mounted on wheels or castered and has a rearwardly protruding handle parallel to and in a lower position in relation to said crossbar member for pushing the cart, the improved shopping cart shelf assembly comprising:

a flat substantially rectangular shelf;

two L-shaped mounting rods respectively extending downwardly from opposite ends of said shelf member, said mounting rods being spaced apart a distance substantially equal to the length of the handle; and means for rotatably coupling said mounting rods through their horizontal section to the lower surface of said shelf member around an axis perpendicular to the length of said shelf member so that the vertical sections of said rods can be folded to a central flat position for shipping purposes, the vertical section of each mounting rod terminating in a hook portion dimensioned for receiving a side of said handle, and the end of the horizontal section bending downward to lock over said crossbar member when said hook portions are coupled to said handle.

4,032,165

DISASSEMBLABLE ARTICLE TRANSPORT, STORAGE AND HANDLING TRUCK

Herman F. Russell, 7350 Brantford Road, Dayton, Ohio 45414

Filed Oct. 9, 1975, Ser. No. 620,958
Int. Cl.² B62B *3/02*
U.S. Cl. 280—79.3 **3 Claims**

1. A disassemblable heavy duty article transport, storage and handling truck adapted to be moved along a floor, said truck comprising

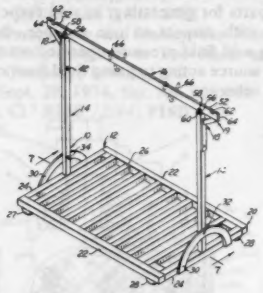
an elongated generally rectangular base structure having laterally- spaced opposite sides and having longitudinally-spaced opposite ends with mid portions thereon,

casters secured to and rollably supporting said base structure in vertically-spaced relationship to the floor whereby to provide space for the insertion of forklift truck forks beneath said base structure,

a pair of upstanding open-centered brace members secured to and extending along a respective opposite end of said base structure in laterally- disposed relationship to said base structure,

each brace member having a central portion disposed above and remote from the mid-portion of a respective end of said base structure,

each brace member having opposite end portions secured to said nearer end of said base structure remote from said mid-portion thereof,



a pair of upright members disposed adjacent said brace members in detachable supported relationship with said base structure,

means separably connecting said brace members to the upright members adjacent thereto,

an elongated article suspension structure detachably secured to the upper end portions of said upright members in spaced parallel relationship to said base structure,

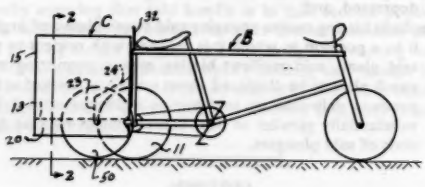
and means separably connecting said article suspension to said upper end portions of said upright members.

4,032,166

BICYCLE PACKAGE TRANSPORT DEVICE

W. Leon Montgomery, 6632 Kingsbury Drive, Dallas, Tex. 75231

Filed Feb. 26, 1976, Ser. No. 661,713
Int. Cl.² B62K *27/06*
U.S. Cl. 280—204 **4 Claims**



1. A load carrying device for a bicycle having a frame, a seat post, a ground engaging rear wheel, and a front steerable wheel, said device comprising: a container having a wheel well along its forward central portion for accommodating said rear wheel, means for rigidly securing said container to said frame rearwardly of said seat post, a pair of outrigger assemblies, a ground engaging wheel rotationally mounted on each of said outrigger assemblies, and means for mounting each of said outrigger assemblies on opposite sides of said containers, respectively, including hinge means secured between each of said outrigger wheel assemblies and an adjacent side face of said container, roller spacer means between said adjacent side

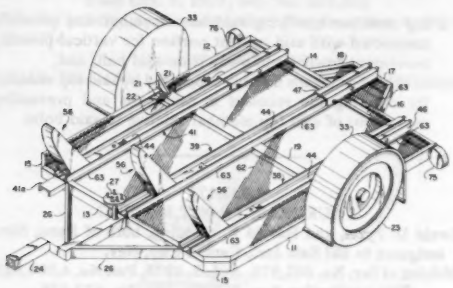
face of said container and said wheel assembly, and elastic snubber means between said container and said outrigger wheel assemblies for biasing said assemblies toward said container against said roller means, said mounting means permitting said outrigger assemblies to move vertically, laterally, and tiltably relative to said container.

4,032,167

TRAILER FOR TRANSPORTING MOTORCYCLES

Wasiliy Chereda, 914 Miller St., Holdrege, Nebr. 68949

Filed Jan. 9, 1976, Ser. No. 647,736
Int. Cl.² B62D 63/06
U.S. Cl. 280—106 T 10 Claims



1. A trailer for transporting motorcycles comprising

a. a rigid frame having a horizontal load-supporting bed;

b. a pair of ground-engaging wheels mounted on aligned stub axles which are carried by and project from opposite sides of the frame, the axles being centered at an elevation above that of the bed;

c. at least one elongated, channel-shaped main track supported on the bed and extending forward from the rear margin thereof, the main track serving to receive and closely confine the tires of a motorcycle;

d. a wheel well fixed in place at the forward end of the main track and serving to receive a portion of the front wheel of a motorcycle, the well comprising side panels which extend along the sidewalls of the cycle tire in both the upper and lower front quadrants of the wheel, and a front panel which engages the tire tread in both of those quadrants, whereby turning, forward and vertical motion of the front cycle wheel is prevented;

e. a channel-shaped auxiliary track section pivotally connected with the frame at the rear end of the main track and forming a longitudinal extension of the main track, the auxiliary track section being free to swing about a horizontal axis and having a loading position, in which it engages the ground and forms a ramp for leading a motorcycle onto the main track, and a clamping position, in which it engages the tread of the rear tire of the cycle stored on the main track at a point in the upper rear quandrant of the cycle wheel;

f. deck means fixed to the frame and extending longitudinally along both sides of the main track, and deck means providing secure footing for a driver guiding a cycle onto the trailer under power; and

g. clamping means for interconnecting the frame and the auxiliary ramp section when the latter is in said clamping position and for pressing that track section tightly against the rear tire of a cycle stored on the main track,

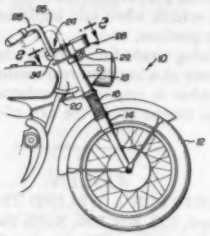
h. whereby the stored cycle is compressed longitudinally between the front panel of the wheel well and the auxiliary track section and is retained in place solely by the action of the clamping means.

4,032,168

HANDLEBAR RISER AND SETBACK WITH DASHBOARD FOR MOTORCYCLES

Donald E. Emerson, Palmdale, Calif., assignor to Space-Age Control, Inc., Paramount, Calif.

Filed Feb. 2, 1976, Ser. No. 654,061
Int. Cl.² B62K 21/12
U.S. Cl. 280—279 7 Claims



1. In a motorcycle having a handlebar and handlebar supporting means,

the improvement comprising:

mounting means for securing the handlebar on the handlebar supporting means,

said mounting means being adapted to set the handlebar back from and above the handlebar supporting means, and

a dashboard on said mounting means,

said dashboard extending forwardly on said mounting means and being comprised of a plate spaced upwardly from the handlebar supporting means and

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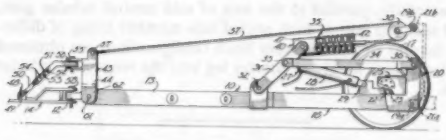
4,032,169

DRAWBAR ASSEMBLY

Alton N. Filan, and A. LaVerne Filan, both of Rte. 1 Box 69, Waitsburg, Wash. 99361

Continuation-in-part of Ser. No. 578,149, May 16, 1975, Pat. No. 3,974,880. This application June 7, 1976, Ser. No. 693,358
Int. Cl.² B60D 1/16; A01B 59/042
U.S. Cl. 280—405 B 7 Claims



1. In a drawbar adapter assembly for connecting a three point hitch implement to a towing vehicle, the combination comprising:

a first framework;

a forward connector member on a tongue of said first framework for operative engagement with a complementary hitch member of a towing vehicle;

a secondary framework mounted to said first framework for pivotal movement about a horizontal pivot axis and having three rearwardly facing three point hitch connectors thereon for operative engagement with complementary connectors of a three point hitch implement;

wheel means for movably supporting the first framework and secondary framework above the ground surface;

wherein the three point hitch connectors are adapted to support an attached implement extending rearward of the wheel means;

jack means interconnecting said first and secondary frameworks and operable to pivot said three point connectors

and attached implement relative to said first framework between (a) an operative position wherein the implement is held in an operative ground engaging condition for movement by the draft vehicle and (b) an inoperative position wherein the implement is lifted from the ground and is supported by said adapter assembly;

tongue load relieving means operatively connected between the three point hitch connectors and the towing vehicle for transferring part of the static load of the implement to the towing vehicle when said implement is carried in the inoperative position; and

tongue stabilizing means for applying a substantially vertical reaction force at a location rearwardly adjacent the connector member in response to substantially vertical moment of the tongue about the axis of said wheel means.

4,032,170

KIT OF PARTS FOR A WELDED TRAILER HITCH

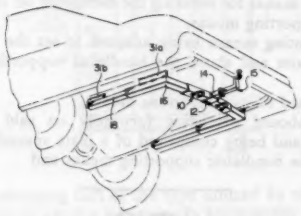
Leonard A. Wood, P.O. Box 750, North Bay, Ontario, Canada

Filed Oct. 15, 1975, Ser. No. 622,484

Claims priority, application Canada, Oct. 31, 1974, 212800

Int. Cl.² B60D *1/00*

U.S. Cl. 280—495 **17 Claims**



1. A kit of parts for an automobile trailer hitch, comprising a cross member including a central tubular part and two symmetrically arranged tubular arms extending from opposite sides of said tubular part, and two angled side members each having two legs the end portions of which are each sized so as to be insertable selectively into the outer ends of the said tubular arms, said legs being set at such an angle that with one leg inserted into one of said tubular arms the other leg is substantially parallel to the axis of said central tubular part, and said two legs of each angled side member being of differing lengths so that different hitch configurations are obtained by inserting a longer or shorter leg into the respective tubular arm.

4,032,171

TRAILER HITCH LOCKING DEVICE

Cloy L. Allen, P.O. Box 224, Wingate, Tex. 79566, and Bobby L. Hook, 1207 S. 6, Merkel, Tex. 79536

Filed May 17, 1976, Ser. No. 687,279

Int. Cl.² B60D *1/06*

U.S. Cl. 280—507 **6 Claims**

1. In combination with trailer hitch components including a trailer hitch socket secured to a trailer hitch ball having its shank connected with a tow bar transversely secured to the rearward end of a towing vehicle, the improvement comprising:

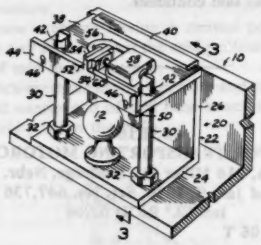
a base member having a generally flat portion overlying said tow

bar and having an aperture in said flat portion surrounding an intermediate portion of the shank of said ball;

a pair of upstanding bolts projecting above the upper limit of said hitch socket and disposed in spaced parallel relation on opposite sides of said ball longitudinally of said tow bar,

said bolts each having a recess in its periphery forming a horizontal shoulder adjacent its upper end,

said base member having a generally upright portion disposed forwardly of said ball;



a top member overlying said base member and pivotally connected with said upright portion for vertical pivoting movement toward and away from said ball; and,

a lockable bar means slidably supported by said top member for entering the recesses in said bolts and preventing movement of said top member relative to said bolts.

4,032,172

TOURING SKI BOOT BINDING

Ewald D. Pyzel, and Harold E. Codding, both of Reno, Nev., assignors to Ski Safe Inc., Carson City, Nev.

Division of Ser. No. 602,976, Aug. 8, 1975, Pat. No. 4,004,823.

This application Apr. 5, 1976, Ser. No. 673,656

Int. Cl.² A63C *9/18*

U.S. Cl. 280—615 **2 Claims**

1. A touring ski binding for releasably securing the toe of a touring ski boot to a touring ski comprising:

a ski binding member secured to the upper surface of a touring ski and a boot binding member secured to the toe of a touring ski boot, each of said binding members having transversely disposed L-shaped binding elements adapted to releasably engage each other; and spring loaded latch means for releasably retaining the binding members in engagement with each other;

the L-shaped binding element of the ski binding member having a vertically disposed transverse lower portion secured to the upper surface of the ski and a horizontally disposed transverse upper portion spaced a predetermined distance above the upper surface of said ski, the horizontally disposed portion of the ski binding member being formed with a latch receiving notch;

the L-shaped binding element of the boot binding member being defined by an L-shaped slot formed in the boot binding member and adapted to receive the L-shaped binding element of the ski binding member, the boot binding member having a horizontally disposed portion that underlies the horizontally disposed portion of the ski binding member when said binding members are in mutual engagement with each other; and

the spring loaded latch means comprising a latch plunger mounted in a longitudinal bore formed in the boot bind-

ing member form longitudinal movement to its latched position and to its unlatched position, said latch plunger being formed with a downward facing recess adapted to receive the horizontal portion of the ski binding member when the latch plunger is at its unlatched position and with a latch portion disposed immediately adjacent said recess of said latch plunger, said latch portion being adapted to be received in the latch receiving notch of the ski binding member when the latch plunger is at its latched position, and a latch spring urging said latch plunger to its latch position.

4,032,173

WHEELED CARRIERS

John Dennis Clegg, Old Garden, 205A Banbury Road, Stratford-upon-Avon, Warwick, England

Filed Oct. 3, 1975, Ser. No. 619,363
Claims priority, application United Kingdom, Oct. 4, 1974, 43046/74
Int. Cl.² B62B *11/00*
U.S. Cl. 280—650 8 Claims

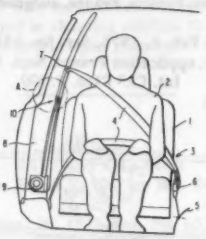
1. In a wheeled carrier of the kind comprising a frame which has a base provided with ground-engaging wheels and a collapsible support which is mounted on the base and is movable between an erected position wherein it extends upwardly from the base and a collapsed position wherein it lies generally flat on the base, a collapsible seat for a child which is supported by a part of the support movable between an erected position to position the seat for use when the support is erected and a collapsed position to collapse the seat when the support is collapsed, and locking means connected between parts of the support for releasably locking the support in the erected position, the improvement wherein the seat-supporting part of the support is operatively connected to the locking means to operate the locking means to lock the support in the erected position on movement of the seat-supporting part towards its erected position and to release the locking means to permit collapsing of the support on movement of the seat-supporting part towards its collapsed position, and the support comprises a first part which is connected to the base for pivoting relative thereto about a first horizontal axis, a second part which is connected to the upper end of the first part for pivoting relative thereto about a second horizontal axis parallel to said first horizontal axis, and a third part which is connected to the base for pivoting relative thereto about a third horizontal axis spaced from and parallel to said first horizontal axis, the second part having a portion which extends downwardly from its pivotal connection to the upper end of the first part and which is connected to the upper end of the third part for pivoting relative thereto about a fourth horizontal axis spaced from and parallel to said second horizontal axis, whereby the three parts of the support are movable between an erected position in which the first and second parts lie generally in a common plane disposed at an inclination to the horizontal and the first and third parts together form a structure of triangular form from which the second part extends upwardly, and a collapsed position in which the three parts are folded generally flat on top of the base.

4,032,174

SAFETY BELT SYSTEM IN A VEHICLE

Rudolf Andres, Sindelfingen, and Heinz W. Knoll, Aidlingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Nov. 28, 1975, Ser. No. 635,753
Claims priority, application Germany, Nov. 30, 1974, 2456670
Int. Cl.² B60R *21/10*
U.S. Cl. 280—745 32 Claims



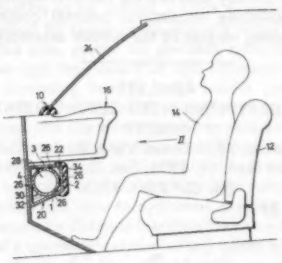
1. A safety belt system for a vehicle, which comprises a belt band means for encompassing a user and a tensioning means for tightening the belt band means against said user with an initial load precluding injury upon reaching a predetermined deceleration value, characterized in that the tensioning means includes a structural part being rotatable and at least partly surrounding the belt band means, said belt band means being freely movable through the structural part during normal operation.

4,032,175

KNEE PROTECTOR IN MOTOR VEHICLE

Tsuyoshi Aibe, Yokohama; Yoshiaki Sugiura, Yokosuka, and Yuzuru Okada, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 2, 1975, Ser. No. 574,032
Claims priority, application Japan, May 9, 1974, 49-52825
Int. Cl.² B60R *21/04*
U.S. Cl. 280—751 18 Claims



1. In a motor vehicle having a seat for a passenger:
a knee protector anchored in a foot space of the passenger, said knee protector comprising an outer hollow body having a bore and permanently deformable flat support walls defining said bore, and a single permanently deformable inner tube disposed within said bore, said inner tube making a contact with each of said permanently deformable walls.

14. In a motor vehicle having a seat for a passenger:
a knee protector anchored in a foot space of the passenger, said knee protector comprising an outer hollow body having a bore and permanently deformable flat support walls defining said bore, and a permanently deformable

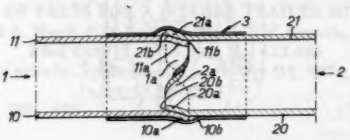
inner rounded wall having two edges, disposed within said bore, said rounded wall having its edges contacting with adjacent corner portions of said permanently deformable support walls and projecting toward a one of all of said permanently deformable support walls which faces the knees of a seated passenger.

4,032,176

METHOD OF ASSEMBLING SEAMLESS FLEXIBLE TUBING AND THE TUBULAR ASSEMBLY OF LENGTHS OF SUCH TUBING

Jean Pierre Tabary, Froissy, France, assignor to Viscora, Paris, France

Filed Feb. 6, 1976, Ser. No. 655,802
Claims priority, application France, Sept. 5, 1975, 75.27312
Int. Cl.² F16L *35/00*
U.S. Cl. 285—18 **7 Claims**



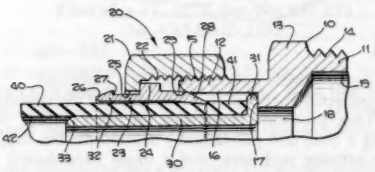
7. A tubular assembly of at least two lengths of seamless flexible tubing, opposed end portions of the lengths of tubing overlapping and contacting each other with the open ends of the tubes extending beyond each other in opposite directions, an adhesive strip wrapped around the overlapping end portions and the adjoining outer surfaces of the lengths of tubing longitudinally therebeyond, said adhesive strip being stuck to the free edge of one of the end portions over half the periphery of the tubular assembly and being stuck to the free edge of the other of the end portions over the other half of the peripheral of the tubular assembly, the stuck free edges of the lengths of tubing being longitudinally offset a distance equal to the longitudinal length of the overlap which is less than one-fourth of the circumference of the tubular assembly; whereby, separating the side walls of one of the tubing lengths at least in the vicinity of the band to give it a substantially cylindrical configuration causes drawing therewith of the corresponding opposed side walls of the other tubing length by the adhesive strip band and thereby intertwining the overlapping end portions and establishing continuous internal communication between the tubing lengths of the tubular assembly.

4,032,177

COMPRESSION FITTING WITH TUBING REINFORCING INSERT

David N. Anderson, 3701 Green Vista, Encino, Calif. 91316

Filed Mar. 18, 1976, Ser. No. 667,889
Int. Cl.² F16L *33/20*
U.S. Cl. 285—24 **2 Claims**



1. A compression type end fitting for non-metal flexible tubing including:

a body having threads and a tubing receiving bore terminating at an internal stop shoulder with a continuing smaller diameter through bore,

a nut sub-assembly of a nut and compression sleeve, the compression sleeve having a tubing receiving through bore and an end portion projecting outwardly of the nut, said nut threaded to said body in untightened relation, and

a tubing reinforcing insert positioned within said body and nut sub-assembly when the latter are preassembled in a relatively untightened relation preparatory to receiving said tubing

retaining means on said insert for loosely retaining said insert within said fitting, said retaining means including a flange located between and being larger than said body and sleeve throughbores, said fitting being free of structure preventing abutting of said flange with said stop shoulder; and

guide means on said insert extending outwardly of said compression sleeve end portion through the throughbore thereof when said insert is loosely retained within said fitting by said retaining means and said insert flange abuts said stop shoulder for guiding a tubing free end over said insert when said nut sub-assembly and body are in said untightened condition,

said flange having an outer diameter smaller than the inner diameter of said body tubing receiving bore so as to be transversely movable therein,

whereby on assembly of tubing to said fitting the tubing can be engaged with said outwardly extending guide means to align said insert relative to said tubing before said tubing is pressed into said fitting and before said nut sub-assembly is tightened onto said body,

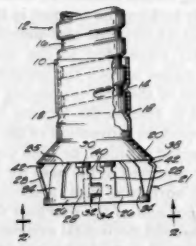
said compression sleeve having an outwardly extending shoulder spaced from one end thereof and engaging a shoulder on said nut, said sleeve having a surface at the other end thereof engaging an end surface of the body and adapted to be deformed inwardly to engage the tubing and to produce a compression type gripping of the tubing for retaining it within the fitting.

4,032,178

ELECTRIC CONDUIT CONNECTOR

Robert J. Neuroth, 101 Kerwin Drive, Ingleside, Ill. 60041

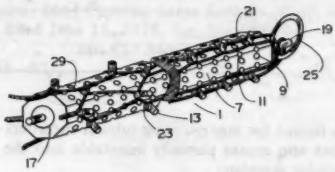
Filed Sept. 4, 1975, Ser. No. 610,200
Int. Cl.² F16L *3/04*; H02G *3/08*
U.S. Cl. 285—162 **13 Claims**



1. An electric conduit connector for connecting one end of an electric conduit to a box having an opening therein for receiving said connector, said connector comprising a unitary one piece metal sleeve adapted at one end to receive an end of said conduit, said sleeve being flared at its other end to a size larger than said opening and having its flared end reduced in diameter to form a reduced end portion which is small enough to enter said opening, said reduced end portion comprising a collar and circumferentially spaced support arms connecting said collar to the flared portion, said collar being split in at least one location and having an expansion joint bridging the split to permit such reduction without buckling of said collar, and means on said reduced end portion for engaging the

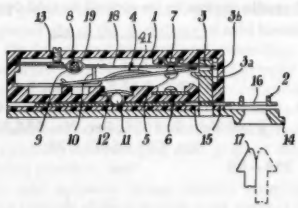
interior margin of said box about said opening to secure said connector to said box.

4,032,179
MACRAME LOOM
Paul Thleman Goss, 156 S. Pope St., Louisville, Ky. 40206
Filed Aug. 13, 1976, Ser. No. 714,046
Int. Cl.[2] D03J *3/00*
U.S. Cl. 289—18 **7 Claims**



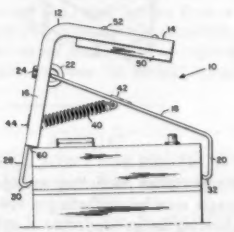
1. A macrame loom comprising: an elongated rod having at least six sides, each side having a face thereon with a row of apertures on each face, said rows of apertures on adjacent faces being parallel with said apertures on adjacent rows; a plurality of cord securing means received by said apertures, said securing means extending outwardly from said rod to receive cords therearound; and, coupling means on each end of said elongated rod whereby a plurality of rods may be coupled.

4,032,180
LOCKING DEVICE FOR WASHING MACHINE DOOR
Walter Pohl, Naples, Italy, assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Aug. 16, 1974, Ser. No. 498,001
Claims priority, application Italy, Aug. 21, 1973, 52111/73
Int. Cl.[2] E05B *15/02*; B65H *25/14*
U.S. Cl. 292—341.16 **1 Claim**



1. A door lock for washing machines and the like comprising body means having a first opening for receiving a door hook and having a second opening, slide means mounted for movement on said body means between an open position and a door hook locking position, said slide means having a first opening to be aligned with said first body opening to receive said door hook when said slide means is in said open position and having a second opening to be aligned with said second body opening when said slide means is in said locking position, a ratchet mounted for movement on said body means into said second openings when said second openings are aligned for holding said slide means in said locking position clamping said door hook, a bimetallic element mounted on said body means for movement in response to selected temperature changes to move said ratchet into and out of said second openings in response to said temperature changes when said second openings are aligned, movable contact means, complementary contact means mounted on said body means, an elastic cantilever element movable with snap-action between a first position spaced from said complementary contact means and a second position engaging said complementary contact means, said cantilever element being movable with said bimetallic element to said second position engaging said movable contact means with said complementary contact means to close an electrical power circuit for said washing machine and the like when said ratchet is disposed in said second body and slide openings, resistance means disposed in heat transfer relation to said bimetallic element, and means for connecting said resistance means in an electrical control circuit of said washing machine and the like for heating said bimetallic element when desired, said means connecting said resistance means in said control circuit comprising a diode arranged in series with said resistance means and additional contact means normally engaged with said movable contact means in said first position thereof in shunting relation to said diode when said slide means is in said open position.

4,032,181
BATTERY CARRIER
George G. Money, Sr., R.D. No. 2 - Box 245, Smyrna, Del. 19977
Filed Jan. 29, 1976, Ser. No. 653,298
Int. Cl.[2] B65G *7/12*
U.S. Cl. 294—16 **8 Claims**



1. A battery carrier adapted to engage the sides of a battery for lifting, tilting or maneuvering the battery into and out of an operating position in a vehicle comprising: an elongated member having a handle portion adapted to extend across the top of a battery to be carried and a leg portion extending at an angle to said handle portion so as to be positioned along the side of a battery to be carried, a hook formed on the end of said leg portion for engaging the side of a battery to be carried, an elongated arm, means for pivotally mounting one end of said arm on said leg portion of said elongated member with said arm extending beneath said handle portion, a hook formed on the other end of said arm for engaging the side of a battery opposite the side engaged by said hook on said leg portion of said member, spring means extending between said arm and said leg portion for biasing said hooks toward engagement with opposite sides of a battery to be carried, said spring means biasing said arm to a normal position in which said hooks are spaced a distance less than the space between opposite sides of a conventional size battery whereby said arm must be moved against the bias of said spring means in order to engage the carrier with a conventional size battery, and a stop formed on said leg portion of said member and spaced from said hook formed thereon for contacting the top of a battery to be carried in the normal battery engaging position of said leg portion along the side of the battery to be carried, said stop having a substantial effective width and including stop surfaces for contacting the top of the battery to be carried at two spaced locations along the top of the side of the battery engaged by said hook on said leg portion, said member is formed of a bent channel of a U-shaped cross-section, the sides of said channel terminating at a location spaced from said hook formed thereon to form said stop surfaces, the base of said channel extending beyond said stop surfaces to form said hook.

4,032,182

PET DROPPING PICKUP DEVICE

Philip O. D'Ath, 10455 N. Lynn Circle, "F", Mira Loma, Calif. 91752

Filed Feb. 27, 1976, Ser. No. 661,995
Int. Cl.² A01K 29/00
U.S. Cl. 294—19 R 11 Claims

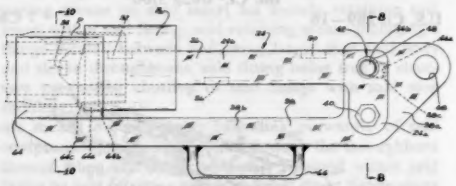
1. A pickup device including an upstanding handle, an L-shaped angle member including a lower horizontal flange and an upstanding flange supported at its lower edge from one marginal edge portion of said horizontal flange, mounting means supporting said upstanding flange from the lower end of said handle, guide means supported from and projecting outwardly of the upstanding flange spaced above said horizontal flange, a depending plate guidingly supported from said guide means for movement therealong toward and away from the upstanding flange over said horizontal flange, said plate being outwardly shiftable along said guide means to a position spaced outwardly of the outer marginal portion of said horizontal flange, control means shiftably supported from an upper portion of said handle, and thrust transfer means operably connected between said control means and said plate operable to shift the latter in response to shifting of said control means, said guide means including a pair of elongated inwardly and downwardly opening parallel angle members including upper horizontal flanges projecting toward each other and depending lower flanges depending from the remote marginal edges of said upper horizontal flanges, said angle members being supported from and projecting outwardly from opposite end portions of the upper marginal portion of said upstanding flange, the upper marginal edge portion of said depending plate including a substantially right angulated horizontal flange projecting toward said upstanding flange, the opposite ends of said right angulated horizontal flange including upwardly struck and offset end tabs, the terminal ends of said right angulated flanges being slidably engaged with said upper horizontal flanges with said end tabs engaged over said upper horizontal flanges and the remainder of each terminal end of said right angulated horizontal flange closely underlying the corresponding upper horizontal flange, the end portions of the upper marginal edge of said depending plate being closely received between the opposing surfaces of said depending lower flanges.

4,032,183

PIPE ELEVATOR

John L. Baugh, and Hollis A. Baugh, both of Houston, Tex., assignors to Brown Oil Tools, Inc., Houston, Tex.

Filed July 28, 1975, Ser. No. 599,839
Int. Cl.² B66C 1/42, 1/62
U.S. Cl. 294—91 6 Claims



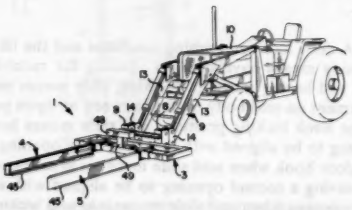
1. A device for manipulating tubular members comprising:
a. first arm means partially insertable into the end of said tubular member;
b. second arm means including cradle means;
c. hinge means joining said first arm means and said second arm means so that, when said first arm means is partially inserted into the end of said tubular member, said second arm means may be rotated on said hinge means generally toward said tubular member causing said cradle means to partially encircle said tubular member in a closed position, wherein said first arm means cooperates with said second arm means and said cradle means to grip said tubular member, and so that said second arm means may be rotated on said hinge means withdrawing said cradle means generally away from said tubular member to an open position to permit said first arm means to be withdrawn from within said tubular member; and
d. lock means automatically actuated, whenever said second arm means is rotated on said hinge means, relative to said first arm means, to said closed position, to positively lock said second arm means and said cradle means in said closed position, and selectively disengageable, independently of motion of said second arm means relative to said first arm means, to permit said second arm means and said cradle means to be moved to said open position.

4,032,184

ROUND BALE LOADER

Calvin B. Blair, P.O. Box 97, Barnard, Kans. 67418

Filed Feb. 9, 1976, Ser. No. 656,337
Int. Cl.² B66C 1/28
U.S. Cl. 294—88 8 Claims



1. A device for handling a round hay bale having a substantially cylindrical surface and opposite bases comprising:
a. a frame adapted for manipulation by a tractor loader;
b. a pair of projecting pin members on said frame;
c. means for moving said pin members laterally toward and away from each other;
d. a pair of generally parallel and projecting arms respectively having a bale engaging inner surface and mounted on said projecting pin members, said arms being freely pivotable on said pin members about respective longitudinal axes thereof;

e. said arms being in cross section a greater height than width with said pin member having mounted above the respective center of gravity of said arms whereby said arms hang vertically oriented when not in lifting contact with said bale surface, said arms pivoting so that said inner surfaces conform to said bale surface when in lifting contact therewith and subsequently return to vertical orientation when the bale is released.

4,032,185

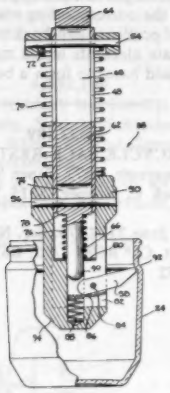
INTERNAL GRIPPER APPARATUS

John J. Peyton, 1644 Payeras, Santa Barbara, Calif. 93109

Filed June 11, 1976, Ser. No. 695,004

Int. Cl.² B66C *1/42*

U.S. Cl. 294—97 **18 Claims**



1. Container gripper apparatus for gripping a container from within upon engagement along a longitudinal axis comprising;

a housing means;

a plurality of gripper members, said gripper members being equally spaced about the periphery of said housing means adjacent the lower end thereof and extending generally radially outward therefrom, each of said gripper members being coupled to said housing means for rotation between extended and retracted positions about axes generally perpendicular to and spaced from said longitudinal axis;

means for yieldably encouraging said gripper members to the extended position; and

an actuator, said actuator being slidably coupled to said housing for relative sliding motion with respect thereto in the direction of said longitudinal axis between extended and depressed positions, said actuator being disposed to engage the inward extending ends of said gripper members when moved to said depressed position.

4,032,186

CONVERTIBLE TRUCK COVER

Phillip A. Pickering, 5823-177th Place Southwest, Lynnwood, Wash. 98036, and Harold W. Pickering, 16727 Linden Ave. North, Seattle, Wash. 98133

Continuation-in-part of Ser. No. 440,586, Feb. 2, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,507

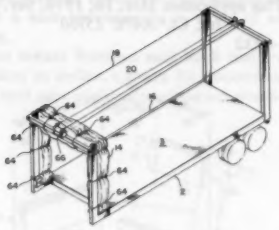
Int. Cl.² B60P *7/00*

U.S. Cl. 296—100 **8 Claims**

1. A cover means for a trailer or the like having a load supporting platform which flexes during normal use including necessary supporting framework comprising:

a. rigid upright members secured to the framework at opposite ends of the platform leaving the remainder of the platform free from obstruction, said upright members including vertically oriented elements adjacent the corners of the platform and at least one substantially horizontal element extending between the vertical elements substantially parallel to the end of the load supporting platform,

b. flexible removable support means yieldable to the flexing of said platform extending from one upright to the other along each side of the platform said support means providing the sole side support for a cover, means for releasably securing said flexible support means to said uprights,



c. flexible cover means of a size capable of substantially covering the load supporting platform, said cover means resting on top of the flexible support means and extending therebetween over the top of the platform, and

d. means for moving the cover means from a contracted position adjacent one of the upright members, uncovering substantially the entire platform to an expanded position overlying the area between the upright members.

4,032,187

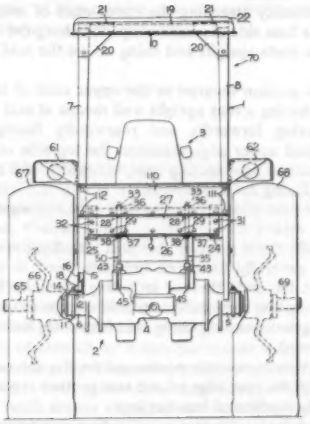
ENERGY ABSORBING JOINT FOR PROTECTIVE FRAME

Ralph R. Atherton, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 22, 1975, Ser. No. 643,316

Int. Cl.² B62D *25/00*

U.S. Cl. 296—102 **10 Claims**



1. A vehicle having a protective frame extending above an operators station comprising, a vehicle chassis, a protective frame mounted on said vehicle chassis including, a pair of upright columns, a support connected to and extending between said upright columns, at least one strut mounted on said vehicle chassis, an energy absorbing joint connecting said strut to said support, said joint including deformable members of said support mounted in spaced relation and forming an opening in said support, an end portion of said strut extending through said opening, an enlargement on said strut at each end

of said opening engaging the opposing sides of said members to brace said support, said enlargements thereby deforming said members and enlarging said opening when said upright columns are deformed due to overturning of the vehicle.

4,032,188

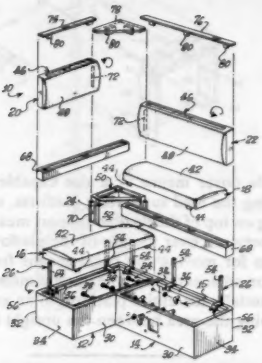
MODULAR BENCH SEAT

Ferris E. Jones, 943 Millbury Ave., La Puente, Calif. 91746

Continuation-in-part of Ser. No. 537,259, Dec. 30, 1974, abandoned. This application Mar. 16, 1976, Ser. No. 667,288

Int. Cl.² A47C *15/00*

U.S. Cl. 297—232 **36 Claims**



1. A modular bench seat construction comprising:

a rectangular base having front and rear sides and vertically facing sides normal to said front and rear sides,

said base being adapted to be positioned with one of said vertically facing sides uppermost to form the top side of the base and the other vertically facing side lowermost to form the side of the base,

a pair of backrest supporting posts having normally upper and lower ends,

means releasibly attaching the lower ends of said posts to said rear base side at positions spaced along the latter side with the posts upright and rising above the said seat portion,

a backrest portion secured to the upper ends of said posts,

said base having a rear upright wall means at said rear base side having forwardly and rearwardly facing surface means and upper edge means at the top side of the base between and intersecting said forwardly and said rearwardly facing surface means,

said lower post ends seating against said rearwardly facing surface means,

the normally front sides of said post attaching means comprising generally L-shaped brackets fixed to said posts between the ends thereof including normally horizontal legs projecting forwardly over said edge means and vertical flanges depending along said forwardly facing surface means, and

a seat portion removably positioned on the top side of said base with the rear edge of said seat portion resting on said normally horizontal bracket legs.

11. A modular bench seat construction comprising:

a pair of rectangular bases each having front and rear sides, ends, and vertically facing sides normal to said front and rear sides and ends,

each base being adapted to be positioned with one vertically facing side uppermost to form the top side of the base and the other vertically facing side lowermost to form the bottom side of the base, whereby each base may occupy either of two upright positions, said bases being arranged in an L-shaped configuration with one end of one base seating against the front wall of the other base and the rear side of said one base coplanar with one end of said other base,

means releasibly joining said bases,

a seat portion removably positioned on the topside of each base,

a pair of backrest supportiing posts for each base having normally upper and lower ends,

means independent of said seat portions releasibly attaching the lower ends of said posts to the rear side of the respective base at positions spaced along the latter side with the posts upright and rising above the corresponding said portion,

a backrest portion for each base having normally horizontal edges and opening means entering one of said edges and removably positioned over the posts on the respective base with the posts entering said opening means to support the backrest portion in an upright position along the rear edge of the corresponding seat portion, and

said posts, seat portions, and backrest portion comprising totally separate elements which may be assembled individually on said bases to form a bench seat.

4,032,189

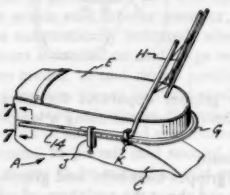
MOTORCYCLE BACK REST ASSEMBLY

Vicente Cruz Benavente, 1372 Taper St., Long Beach, Calif. 90810, and Jack C. Napper, 3815 Volk St., Long Beach, Calif. 90808

Filed June 21, 1976, Ser. No. 698,044

Int. Cl.² B60N *1/06;* **B62J** *1/28*

U.S. Cl. 297—352 **5 Claims**



1. In combination with a motorcycle that has a first frame that includes a pair of first parallel legs disposed on opposite sides of a rearwardly disposed fender, an elongate longitudinally extending seat, a second frame secured to said seat, said first and second frames including first and second inturned portions having a plurality of longitudinally spaced sets of first and second bores therein, a plurality of threaded members that engage said sets of first and second apertures and removably lock said seat and second frame to said first frame, a back rest assembly that is longitudinally and pivotally adjustable relative to said seat, said backrest assembly including:

a. a tubular U-shaped support that includes a pair of first, laterally spaced, parallel legs that are disposed outwardly from said first frame, each of said first legs including a pair of longitudinally spaced inturned tabs that are gripped between said first and second inturned portions, each of said tabs having a third bore therein that is aligned with one of said sets of said first and second bores and through which third bore one of said threaded members extends;

b. forward and rearwardly disposed rigid cross pieces that extend between said first legs and are rigidly secured thereto;

c. a back rest that includes a pair of second laterally spaced parallel legs that have first and second ends, said second legs overlying said first pair of legs, with said second legs at said second ends effecting junctions with a pair of elongate extensions that project upwardly and angle rearwardly relative to said second pair of legs, and said back rest having a plurality of rigid cross members extending

therebetween to maintain said extensions in fixed lateral spacing;

d. a pair of spring loaded slide means rigidly secured to said pair of said second legs adjacent said first ends thereof, said slide means slidably engaging said first legs for longitudinal movement between said pairs of inturned tabs;

e. a pair of pivot means that pivotally engage said back rest at said junctions, said pivot means slidably engaging said first pair of legs and being longitudinally movable to a plurality of positions between said pairs of tabs;

f. a pair of first manually operable means for selectively holding said pair of pivot means at any one of a plurality of longitudinally spaced positions on said first pair of legs; and

g. a pair of second manually operated means for selectively moving said pair of slide means either up or down relative to said first pair of legs to pivot said back rest to a position where said pair of extension and cross members are disposed at a desired angle relative to said seat.

4,032,190

ERGONOMICALLY DESIGNED CHAIR

Wolfgang Müller-Deisig, Schieder-Schwalenberg, and Egon Braüning, Weil am Rhine, both of Germany, assignors to Fehlbaum, Basel, Switzerland

Filed June 7, 1976, Ser. No. 693,610

Claims priority, application Switzerland, June 13, 1975, 7721/75

Int. Cl.² A47C *3/00*

U.S. Cl. 297—353 **6 Claims**

1. An ergonomically designed chair comprising a rigidly mounted seat, a back rest integrally joined to the seat and a shoulder rest integrally joined to the upper end of the back rest, the profile of the central region of the back rest substantially matching the curve of the human spine, wherein the back rest is joined to the seat by means of a portion of the back rest which fits into a region at the rear center of the seat and at least said portion of the back rest is provided with stiffening means which impart to the back rest a substantially stiff form up to about the level of the sixth lumbar vertebra of the chair occupant, thus ensuring a continuous transition from the chair seat to the back rest, but allow the back rest an increasingly greater flexibility from said level upwards with the result that the upper part of the back rest bends backwards when the occupant leans back, and wherein the upper end of the back rest is joined to the shoulder rest via a bracing corrugation in order to ensure that the chair profile in the region of the occupant's shoulders is a smooth curve matching that of the occupant's spine.

4,032,191

TWO-POSITION SCHOOL BUS SEAT

Joseph T. Fetsch, 26 Concord Road, Port Washington, N.Y. 11050

Filed Feb. 13, 1973, Ser. No. 332,063

Int. Cl.² A47C *5/10;* **B60N** *1/06*

U.S. Cl. 297—440 **1 Claim**

1. An adjustable two-position school bus seat, to accommodate adults or children, to provide a seat to have either of two positions, with different depth dimensions, namely, a forward position and a retracted position, said bus seat comprising:

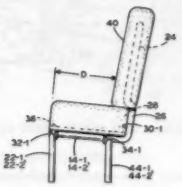
a back rest frame;

a back rest cushion supported on said back rest frame;

a foundation support structure for said back rest frame and seat, generally, said foundation support embodying two rigid structural elements disposed at a predetermined fixed spacing;

a movable seat cushion to rest on said foundation support structure, and movable to be selectively manually disposed with either transverse edge facing to the front to provide a seat immediately in front of said back rest cushion;

connection means between said back rest frame and said foundation to define a space for accommodating a portion of said seat cushion in retracted position;



and self-gripping and self-releasing clamping means secured to said cushion bottom surface, and serving also as positioning means to fit onto the foundation support structure and to wedge against said two rigid structural elements in position to locate the cushion in either selected position, and to hold said seat cushion against undesired movement, and

said clamping means are depending lugs, and include one pair positioned at a short distance from one transverse edge of the seat cushion in a first position, and include a second pair of depending lugs positioned at a long distance from the other transverse edge of the seat cushion, so the forward positioning of either transverse edge will be controlled according to the positioning of the respective pair of lugs relative to said structural elements of the foundation support structure.

4,032,192

LATCHING MECHANISM FOR REAR GATE OF DUMP VEHICLE WITH AUTOMATIC TILT RELEASE

Robert Eugene Jensen, Tennant, Iowa, assignor to Leonard M. Brannan, Omaha, Nebr., a part interest

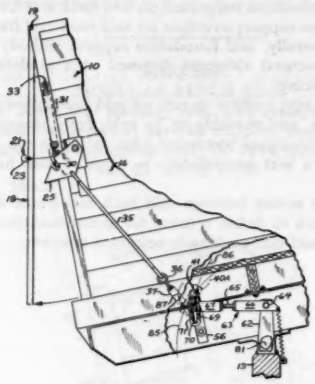
Filed Jan. 5, 1976, Ser. No. 646,598

Int. Cl.² B61D *9/02*

U.S. Cl. 298—23 A **7 Claims**

1. In combination with a dump vehicle having a box with an openable end gate, said box carried by a wheeled frame, and rearwardly tiltable about a first horizontal axis, the improvement comprising: latch means pivotally mounted to said box for movement between an open position and a latching position, said latch means engaging and coupling to said gate in the latching position; a shaft extending transverse of said box and rotatably mounted thereto at a location rearward of said tilt axis; first link means connected between said shaft and said latch means for moving said latch means between said open and latching positions when said shaft is rotated; second actuator link means having one end connected to said shaft; and means for pivotally mounting the other end of said actuator link means to said frame at a location above said tilt axis; whereby as said box is tilted to the rear said shaft will rotate in a first arc about said tilt axis and said one end of said actuator link means will rotate about a second arc centered at the

pivotal connection of said other end of said actuator link means to rotate said shaft and thereby move said latch means



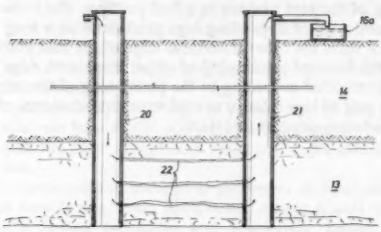
to said open position and release said end gate in quick release motion.

4,032,193

COAL DISAGGREGATION BY BASIC AQUEOUS SOLUTION FOR SLURRY RECOVERY

Gary Drinkard; Michael Prats, and Stephen Michael O'Brien, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 28, 1974, Ser. No. 455,695
Int. Cl.² E21C 41/02
U.S. Cl. 299—4 11 Claims



1. A process for removing subterranean coal which comprises contacting said coal in situ with a basic aqueous solution and maintaining said contact for a time sufficient to completely disaggregate at least a portion of said coal, disintegrating said portion to form a slurry, and transporting said slurry to a receiving terminal.

4,032,194

METHOD FOR THE PRODUCTION OF MINERALS

Eddie P. Howell, and Orland J. Gant, Jr., both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 23, 1976, Ser. No. 716,495
Int. Cl.² E21B 43/28
U.S. Cl. 299—4 7 Claims

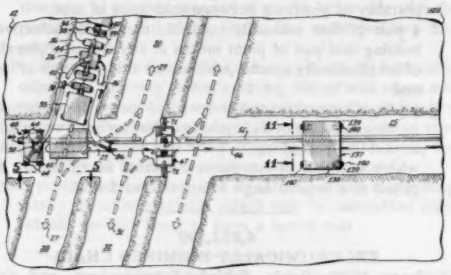
1. An improved method for the solution mining of a mineral from a subterranean formation containing same in which an injection and production well are drilled and completed within said formation, leach solution and an oxidant are injected through said injection well into said formation to dissolve said mineral, and said dissolved mineral is recovered via said production well, wherein the improvement comprises positioning said injection well in the reduced zone and said production well in the oxidized zone of said formation.

4,032,195

PUSH-PULL MINING SYSTEM

Oliver B. Kilroy, 5 Calle Corta, Tucson, Ariz. 85716

Continuation-in-part of Ser. No. 578,312, May 16, 1975, Pat. No. 3,993,354. This application July 19, 1976, Ser. No. 706,916
Int. Cl.² E21C 35/20, 41/04
U.S. Cl. 299—19 16 Claims



1. In a push-pull mining system

a. a substantially horizontal service tunnel having a floor formed with a central flume extending longitudinally thereof and having a declined portion;

b. a holding tunnel extending laterally from one side of, and at one end of said service tunnel;

c. a mobile mining unit positioned in said holding tunnel and comprising:

I. a pair of mining machines located at opposite ends of said unit with each machine including a slurry mix tank,

II. a pump operatively connected with each of said slurry mix tanks.

III. a plurality of wheeled carriers between said mining machines and including a mid-carrier;

IV. a fixed water line extending between said machines, supported by said carriers, and communicating with the slurry mix tanks in said mining machines, and

V. a fixed slurry line extending between said mining machines, being connected to said pumps, and supported by said carriers,

d. a mobile water station connected to a water supply source;

e. a flexible water line extending from said station to said mid-carrier where it is connected to said fixed water line;

f. valve means for establishing communication between said flexible water line through said fixed water line to one of said slurry mix tanks to the exclusion of the other mix tank;

g. a flexible slurry line extending from said mid-carrier where it is connected to said slurry line, and having a length in excess of one-half the length of said mobile mining unit;

h. valve means for establishing communication between said flexible slurry line through said fixed slurry line to the slurry mix tank of one mining machine to the exclusion of the slurry mix tank of the other mining machine;

i. power driven traction means in said mining unit for moving said unit out of said holding tunnel, across said service tunnel to form a working tunnel on the side of said service tunnel opposite to said working tunnel, and then back across the service tunnel to form a second working tunnel behind said holding tunnel, making turns as it does so, and so on to form a plurality of working tunnels extending laterally from said service tunnel;

j. a power station removably positioned in said service tunnel in the vicinity of the junction of a working tunnel therewith and including means for drivably engaging said flexible slurry line to exert a push and pull thereon and maintain that portion of the flexible slurry line which is

positioned in the service tunnel against lateral displacement whereby it extends into said flume;

k. a main slurry mix tank below said service tunnel, and

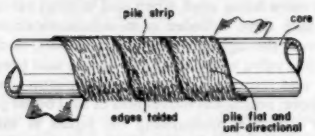
l. a slurry tube connected to said main slurry mix tank and extending upwardly to said flume where its upper end portion is deformed to slideably receive the free end of said flexible slurry line.

4,032,196

PROCESS FOR TREATING PILE MATERIALS MADE INTO ELECTROPHOTOGRAPHIC TONER REMOVAL BRUSHES

Thomas G. Kandel, 100 E. Hartsdale Ave., Hartsdale, N.Y. 10530

Filed Oct. 23, 1975, Ser. No. 625,650
Int. Cl.² A46D *19/00*
U.S. Cl. 300—21 11 Claims



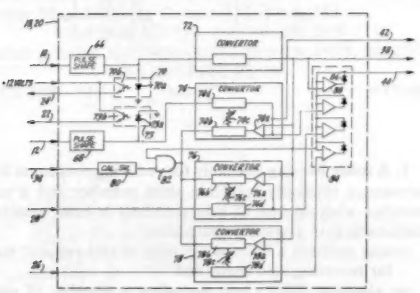
1. A process for making an electrophotographic toner removal brush which comprises subjecting a pile substrate material to an aqueous medium, withdrawing excess moisture therefrom and simultaneously orienting the pile allowing the still wet material to dry, applying the resulting dried pile material to an elongated tubular base core forming an elongated pile-covered tube and subjecting said pile to a further aqueous treatment, and then finally subjecting said pile to a centrifugal force sufficient to hurl the pile fibers to an erect condition forming a brush nap wherein the density of each pile fiber has been increased by rapid centrifugal removal of the water therefrom and allowing the brush to dry.

4,032,197

SLIP/SLIDE DETECTOR CONTROL CIRCUIT

William H. Kohler, Ringwood, N.J., assignor to Abex Corporation, New York, N.Y.

Filed May 4, 1976, Ser. No. 682,916
Int. Cl.² B60T *8/10*
U.S. Cl. 303—96 13 Claims



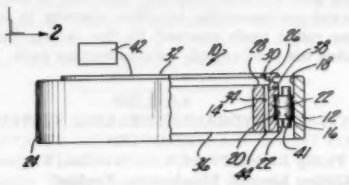
1. In a friction brake control system for a vehicle having two front and two rear axles, means for providing a speed signal for each axle having a variable dependent upon axle angular speed, front axle speed comparison means having direct inputs from said from axle speed signal means and electrically discontinuous and isolated inputs from said rear axle speed signal means and an output representing either the highest or lowest axle speed of the front and rear axles, and means for comparing the front axle speed comparison means output with said front axle speed signals to provide a slip/slide control signal.

4,032,198

BEARING ASSEMBLY WITH LUBRICATION AND COOLING MEANS

Glenn W. Hamburg, Grosse Pointe Park, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Jan. 5, 1976, Ser. No. 646,872
Int. Cl.² F16C *1/24*
U.S. Cl. 308—76 4 Claims



1. A bearing assembly comprising:

a generally cylindrical inner ring, said inner ring rotating during operation of said bearing,

a generally cylindrical outer ring disposed radially outwardly from said inner ring,

bearing members disposed intermediate said inner ring and said outer ring and adapted to permit said inner ring to rotate relative to said outer ring,

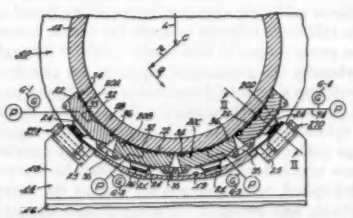
said inner ring having an annular groove formed therein adjacent one end, a plurality of axially extending bores formed in said inner ring and having an end communicating with said annular groove, each of said axially extending bores having a radial bore associated therewith, said radial bores being formed in said inner member having one end communicating with said associated axially extending bore and the other end opening to said bearing members whereby lubricant directed into said annular groove operation of said bearing is directed by centrifugal force through said axially extending bores and through said radial bores to said bearing.

4,032,199

APPARATUS FOR EQUALIZING RADIAL LOAD ON PLURALITY OF PIVOTED BEARING PADS

Raymond C. Jenness, Milwaukee, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Division of Ser. No. 508,983, Sept. 25, 1974, Pat. No. 3,918,770. This application Apr. 30, 1976, Ser. No. 682,075
Int. Cl.² F16C *17/06*
U.S. Cl. 308—73 10 Claims



1. In combination, a journal bearing adapted to support a journal for rotation and comprising an even number of bearing pads in excess of two spaced from each other circumferentially of the journal being supported and lying beneath the circumference of the journal and symmetrically positioned about the vertical axis of the bearing, each of said bearing

pads being adapted to pivot on a corresponding support surface lying radially outwardly of the respective bearing pads, two of said bearing pads being located substantially centrally of the circumferential span of the plurality of bearing pads, the support surfaces for said two centrally located bearing pads being substantially radially fixed, means for separately radially adjusting the respective support surfaces for the remaining bearing pads whereby to adjust the relative radial load carried by all of said bearing pads, a separate source of hydraulic pressure corresponding to each of the respective bearing pads and connected to the interface between the respective corresponding bearing pads and said journal, and separate hydraulic pressure gauge means corresponding to each respective bearing pad for indicating the hydraulic pressure at each respective corresponding interface whereby to indicate the relative radial loads assumed by the various bearing pads including the two centrally located bearing pads.

4,032,200

ANTI-SKID HYDRAULIC BRAKING SYSTEMS FOR VEHICLES

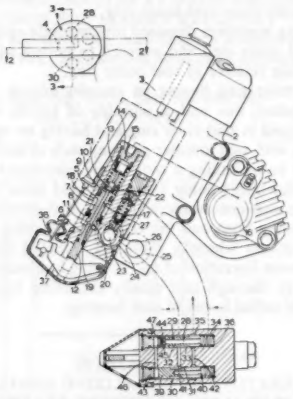
Glyn Phillip Reginald Farr, Leek Wootton, England, assignor to Girling Limited, Birmingham, England

Filed May 4, 1976, Ser. No. 682,980

Claims priority, application United Kingdom, May 10, 1975, 19742/75

Int. Cl.² B60T *8/087*

U.S. Cl. 303—116 **10 Claims**



1. An anti-skid hydraulic braking system comprising a brake applying means, a master cylinder, means connecting said brake applying means to said master cylinder, a reservoir for liquid, a pump having drive means which increases the pump throughput with increased wheel rotational speed, means connecting the pump input to said reservoir, at least on slave cylinder of a wheel brake, means connecting said master cylinder to said slave cylinder for supplying liquid under pressure to said slave cylinder to apply the brake, means connecting the pump output to said master cylinder through a restriction whereby the pressure of liquid in the circuit on the upstream pump side of said restriction is increased to generate a boost pressure which augments the pressure applied to said slave cylinder, a leakage path by-passing the restriction, said leakage path comprising means providing a resistance to liquid flow which decreases automatically with increased wheel rotation speed, sensing means for sensing the deceleration of the wheel, and pressure reducing means operable by said sensing means when the deceleration of the wheel exceeds a predetermined value to reduce said boost pressure whereby the pressure applied to said slave cylinder is reduced, said master cylinder comprising a housing having a bore, an operating piston and a boost piston both working in a said bore, a boost chamber defined in a part of said bore between adjacent ends of said pistons, means connecting said boost chamber to said pumps a pressure space defined in said bore at an end of said boost piston remote from said operating piston, a reservoir return port in said housing located between said boost chamber and said pressure space, means connecting said reservoir return port to said reservoir, an outlet port in said housing in communication with said pressure space, means connecting said outlet port to said slave cylinder, passate means interconnecting said boost chamber, said return port and said outlet port, a boost control valve

between said pistons movable between a normally open inoperative position in which said boost chamber is in communication with said return and outlet ports and an operative closed position when said master cylinder is operated in which said boost chamber is isolated from said return and outlet ports so that pressure is said boost chamber is increased to advance said boost piston in said bore to pressurise liquid in said pressure space, and a recuperation valve controlling comminication between said passage means and said pressure space, said recuperation valve being open when said control valve is open so that said slave cylinder is in communication with said reservoir through said recuperation port, and said recuperation valve being closed to isolate said pressure space from said reservoir when said boost piston is advanced in said bore, additional movement of said boost piston in the same direction pressurising the liquid in said pressure space.

4,032,201

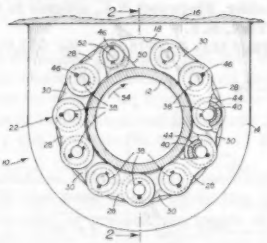
ROLLER BEARING ASSEMBLY

Allen Jacob Jones, Grants Pass, Oreg., assignor to S. J. Agnew, Tenino, Wash.

Filed Dec. 10, 1975, Ser. No. 639,380

Int. Cl.² F16C *13/00*

U.S. Cl. 308—207 R **9 Claims**



1. A roller bearing assembly for reducing rotational friction between a relatively rotatable shaft member and a support member wherein one of said members is held substantially stationary, said assembly comprising

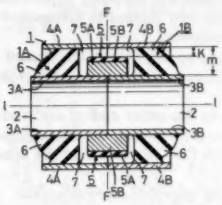
means defining a circular opening in said support member for receiving said shaft, and

an elongate roller chain including a plurality of pivotally interconnected links and a roller rotatably connected in each of said links, said roller chain being shorter than the circumference of said shaft member and being wrapped about said shaft member between said shaft member and the edge margins of said support member defining said opening, with opposite ends of said roller chain being unconnected to each other and the rollers in said chain engaging one of said members to provide rolling support between said members.

4,032,202
VIBRATION CONTROL BUSH ASSEMBLY

Masaru Ishikawa, Toyota, and Akihiko Kumazawa, Nagoya, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 16, 1976, Ser. No. 667,285
Claims priority, application Japan, Mar. 19, 1975, 50-38076[U]
Int. Cl.² F16C *27/00*
U.S. Cl. 308—238 **14 Claims**

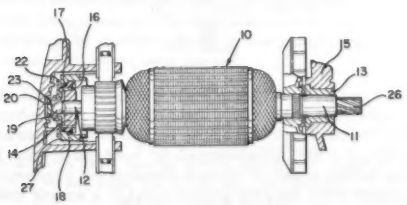


1. A cylindrical bush assembly for vibration control comprising a pair of cylindrical sections which are joined end to end symmetrically with respect to an interface therebetween, and a cylindrical stop member of elastic material coaxially secured to said cylindrical sections in the vicinity of said interface, each of said cylindrical sections being formed by an inner cylinder, an outer cylinder coaxially encircling said inner cylinder and radially spaced apart from said inner cylinder to define a cylindrical clearance space between said inner and outer cylinders, each of which terminates at one end in said interface, and a generally cylindrical impact absorbing member of elastic material partly filling said clearance space and coaxially encircling said inner cylinder, said elastic material of said stop member being generally greater in hardness than that of said impact absorbing member, said impact absorbing members of said cylindrical sections being both recessed from said interface at one end to define a cylindrical hollow space therebetween in which said stop member coaxially encircles said inner cylinders, said stop member having a wall thickness which is smaller than the radial width of said hollow space.

4,032,203
BEARING ARRANGEMENT FOR THE ARMATURE SHAFT OF AN ELECTRIC MOTOR

Lorenzo Ercole Alessio, Lecco, Italy, assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed June 2, 1976, Ser. No. 692,213
Claims priority, application Italy, June 10, 1975, 24222/75
Int. Cl.² F16C *23/00*
U.S. Cl. 308—72 **9 Claims**



1. A bearing arrangement for the shaft of the armature of an electric motor disposed in a support frame and subject to axial thrust comprising:

a bearing housing disposed so as to receive an end portion of the shaft therein and defining a bearing wall for receiving the axial thrust of said shaft, said bearing housing having structure formed thereon for mounting said bearing housing to the support frame;

bearing means at the interface of said bearing wall and said end portion for transmitting the axial thrust of the shaft to said bearing wall;

shaft bearing means for rotatably engaging said end portion;

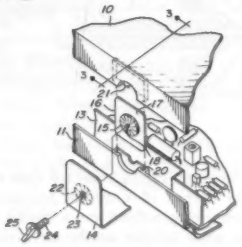
elastic means interposed between said structure and said support frame for deforming elastically in response to the axial thrust applied to said bearing wall; and,

said structure being located with respect to said shaft axially back of the end of said end portion and said bearing wall being disposed axially beyond said structure and said end portion so that the axial thrust of the shaft against said bearing wall will cause the bearing housing to deform said elastic means to thereby center itself with respect to said axial thrust thereby taking up misalignment of the shaft relative to said shaft bearing means.

4,032,204
ADJUSTABLE MOUNTING ARRANGEMENT FOR ELECTRONIC APPARATUS

Melvin Stanley Nation, Lombard, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 21, 1976, Ser. No. 698,377
Int. Cl.² B60R *11/02*
U.S. Cl. 312—7 R **8 Claims**



1. A mounting arrangement for supporting and positioning an electronic apparatus, the arrangement comprising:

rigid insert means, each having a flange means, a first integral fastener means, and a first positioning means;

resilient plastic housing means comprising two mating portions, each housing portion being adapted to releasably retain a substantial portion of the insert flange means, the insert means being non-releasably and non-rotatably retained within the housing when the housing portions are mated;

a rigid support member including a second positioning means;

a second fastener means adapted for engagement with each first fastener means for attaching the housing means to the support means and for bringing the first positioning means into engagement with the second positioning means for positioning the apparatus housing means.

4,032,205
ADAPTOR FOR A HIGH VOLTAGE CABLE

Hatim H. Taj, Waukesha, Wis., assignor to RTE Corporation, Waukesha, Wis.

Filed Sept. 10, 1976, Ser. No. 722,009
Int. Cl.² H01R *15/00*
U.S. Cl. 339—13 **13 Claims**

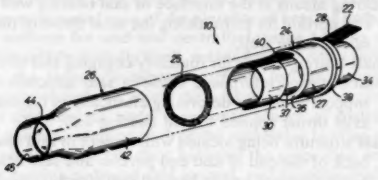
1. A ground contact adaptor for a high voltage cabel having a portion of the metallic tape shield exposed for cable termination, said adaptor comprising:

an elastomeric sleeve,

an electrically conductive band,

an electrically conductive member secured to said band and embedded in said sleeve and extending outwardly therefrom for providing an external ground contact,

means biasing the conductive band into engagement with



the metallic tape shield and means enclosing said band and said electrically conductive member.

4,032,206

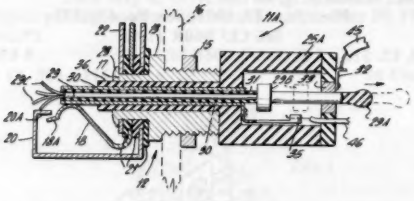
REMOTE VOLUME CONTROL PLUG

Jack Lerner, 337 W. 71st St., New York, N.Y. 10023

Filed Mar. 31, 1976, Ser. No. 672,293

Int. Cl.² H01R *17/18*

U.S. Cl. 339—42 **4 Claims**



1. A plug for insertion into a standard type current socket connected to the output of a circuit producing voice frequency waves comprising: a fixed and a flexing spring contact in the socket; an axial tubular conductor connected to one terminal of the plug and adapted to make contact with the flexing spring contact; an axial conductive rod within the tubular conductor for connection to a second plug terminal: an insulator tube between the tubular conductor and axial rod; an array of prebent outwardly divergent conductive filaments for electrical connection to the fixed spring contact in the socket secured to and extending from the said rod for connecting the plug terminals in series with the socket contacts, and a variable resistive element connected to said terminals.

4,032,207

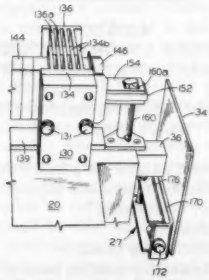
HIGH CURRENT ELECTRICAL JOINT APPARATUS

Eric Axel Ericson, Plainville, and Frederick Daniel Kaufhold, Forestville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed June 21, 1976, Ser. No. 698,280

Int. Cl.² H01R *13/62*

U.S. Cl. 339—75 M **15 Claims**



1. Electrical joint apparatus comprising, in combination:

A. an array of spaced first electrical connectors, each having plural contact elements arranged in parallel spaced relation;

B. an array of second elecrical connectors, each associated with a different one of said first connectors and having at least one contact element arranged for juxtaposition in lapped relation with said contact elements of its associated one of said first connectors;

C. an elongated clamping rod extending freely through apertures in the contact elements of each said first electrical connector;

D. a first cam follower affixed to one end of said rod;

E. a second cam follower movably supported on said rod adjacent said one end thereof in juxtaposed relation with said first cam follower;

F. first compression spring means interposed between said second cam follower and the first connector at one end of said array;

G. a stop affixed to the other end of said rod;

H. second compression spring means interposed between said stop and the first connector at the other end of said array; and

I. camming means movable between joint clamping and joint unclamping positions, said camming means while in said unclamping position controllably engaging said first and second cam followers to sustain said first and second compression spring means in substantially unloaded conditions to thereby permit said contact elements of said first and second connectors to move into and away from lapped relation, said camming means operable in said clamping position to cam said first and second followers in opposite directions to uniformly load said first and second spring means such as to develop substantially equal and oppositely directed forces effective to clamp said lapped contact elements in secure electrical interconnection.

4,032,208

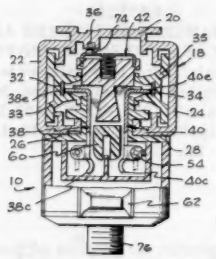
CONNECTOR FOR TRACK LIGHTING SYSTEM

Hans Peter Berkenhoff, Ludenscheid, Germany, assignor to Lightcraft of California, Los Angeles, Calif.

Filed Mar. 22, 1976, Ser. No. 669,243

Int. Cl.² H01R *7/32, 13/54*

U.S. Cl. 339—88 R **3 Claims**



3. In a connector for installation in a tube-like track which has a slot and which has a pair of electrical conductors, wherein the connector had a head portion which can enter the track slot at a first orientation of the head portion the head portion having a pair of contact elements for engaging said conductors when the head portion turns to a second orientation, the improvement comprising:

a member moveably mounted on said connector and coupled to said contact elements to retract and extend the elements with respect to the tract conductors as said member moves between first and second positions, said member being positioned so it contacts said track and is maintained by said track at said first position when said head portion lies in said track at its first orientation, but

said member is free to move to said second position as said head portion turns to its second orientation; and

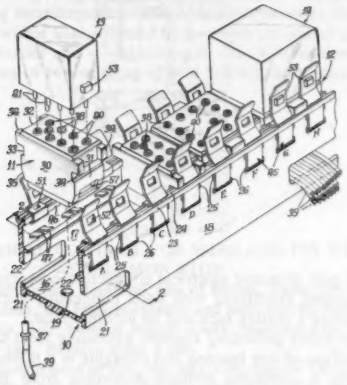
spring means for urging said member to said second position.

4,032,209

MULTIPLE SOCKET ASSEMBLY FOR ELECTRICAL COMPONENTS

John L. Rutkowski, Mount Prospect, Ill., assignor to Appleton Electric Company, Chicago, Ill.

Filed Jan. 15, 1976, Ser. No. 649,477
Int. Cl.² H01R 13/54
U.S. Cl. 339—91 R **5 Claims**



1. In an electrical apparatus comprising electrical component means, connector means having wires extending therefrom and a mounting track, said track including a pair of parallel rails defining a space therebetween, said connector means being positioned in said space and supported on said rails, said means having a plurality of mating plugs and sockets for releasably securing the component means to the connector means, the improvement comprising:

a plurality of pairs of spring clip means engaging the track, the two clip means of each pair being mounted opposite each other on respective rails and each pair defining a station, said track having the general shape of a U shaped channel having an open side and including a base between said rails opposite said open side, said rails at each station having members for supporting a connector means at said open side and at a specific location above said base whereby the wires may extend through the part of that space between the connector means and the base, said clip means and said component means having interengaging devices for releasably securing the clip means to the component means, said clip means applying a spring force between the track and the component means urging the component means onto the connector means and holding the combination of a component means and a connector means onto the rail.

4,032,210

ELECTRICAL SPLICE

Kuno J. Vogt, 5854 Kantor Court, San Diego, Calif. 92122

Filed June 10, 1976, Ser. No. 694,801
Int. Cl.² H01R 13/38
U.S. Cl. 339—98 **8 Claims**

1. An electrical connector comprising:

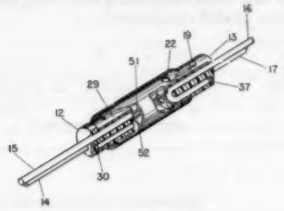
a first insulative member;

first and second channels in said first insulative member dimensioned for receiving first and second conductors to be spliced;

first and second recesses in said first insulative member dimensioned for receiving said first and second conductors after passage through said first and second channels;

first and second protuberances disposed on opposite sides of said first insulative member;

a second resilient insulative member, said second insulative member having a recess one one end thereof dimensioned for receiving said first insulative member;



first and second conductive pins carried by said second insulative member and being geometrically disposed for electrical contact with any conductors disposed in said first and second recesses, respectively;

first and second apertures in said second insulative member geometrically disposed for receiving said first and second protuberances, respectively; and

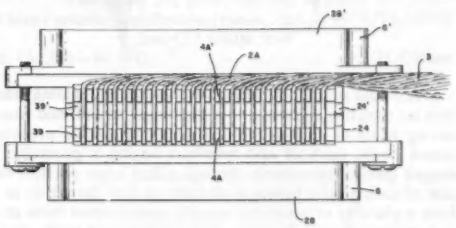
electrical output means coupled to said first and second conductive pins.

4,032,211

MULTI-CONDUCTOR HALF-TAP CONNECTION

John James Tucci, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 649,010, Jan. 14, 1976, Pat. No. 4,007,534. This application Nov. 1, 1976, Ser. No. 737,827
Int. Cl.² H01R 13/38
U.S. Cl. 339—99 R **10 Claims**



1. an electrical tap connection for a multi-conductor cable, said tap connection comprising:

first and second multi-contact electrical connectors, said connectors each having a mating side and a rearward side,

a plurality of parallel terminal receiving cavities extending from said mating side to said rearward side in each of said connectors,

contact terminals located in said terminal receiving cavities, each of said terminals having a contact portion located on said mating side and a wire-receiving portion located on said rearward side, said first and second connectors being positioned with corresponding terminals being in precise axial alignment,

a plurality of individual wires comprising said cable, said wires extending from one end of said first connector generally perpendicular to said parallel rows of terminal receiving cavities and terminals therein,

said wires extending generally between said wire-receiving portion and said contact portions of said terminals in said first connector,

a right angle bend in one of said wires adjacent to each of said terminals in said first connector, each of said wires

being attached intermediate their ends to said wire-receiving portions in said first connector and being attached relatively nearer their ends to wire-receiving portions of corresponding terminals in said second connector,

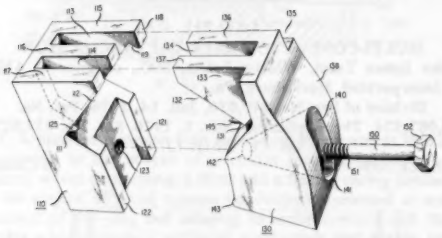
whereby a tap connection for said multi-conductor cable can be formed utilizing two separate multi-contact connectors and in which said wires comprising said cable comprise the interconnection of said connectors.

4,032,212

STRAND ADAPTER FOR AERIAL CLOSURES AND CABLE TERMINALS

Carl Walter Faust, Dover, and Arnold Ray Smith, Chester, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 28, 1975, Ser. No. 635,750
Int. Cl.² H01R 7/08
U.S. Cl. 339—109 5 Claims



1. A strand adapter including first and second mating members for coupling apparatus to a messenger strand, said strand having an outer diameter which is variable within predetermined limits, each of said members having a generally V-shaped groove transversely through a first inner portion, one side of each groove having a plurality of slots therein so as to form a plurality of generally, equally spaced-apart teeth at an end portion of each member, said spaced-apart teeth of said first member aligned to intermesh with said spaced-apart teeth of said second member,

means for securing said first and second members to one another and to said apparatus,

means, integral with said first member, for supporting said first and second members on said messenger strand when said first and second members are loosely coupled to one another in an unmated relationship, said supporting means comprising a hook-like extension integral with an outer one of said spaced-apart teeth of said first member, said extension having an edge face generally perpendicular to said one side of said first member V-shaped groove and generally parallel to another side of said first member V-shaped groove, said supporting means further diminishing rotation of said first member and said apparatus in a direction about an axis of said securing means before said second member is brought into a mated relationship with said first member upon actuation of said securing means, and

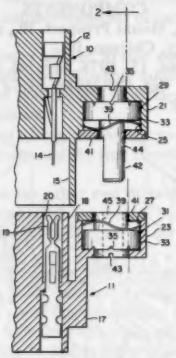
means, integral with said first and second members, for diminishing the rotation of said first and second members and said apparatus circumferentially about an axis of said messenger strand as said securing means is further actuated.

4,032,213

POLARIZING MEANS FOR ELECTRICAL CONNECTORS

Gene Larry Snyder, Bainbridge, and David Thomas Braid, Rochester, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed Jan. 29, 1976, Ser. No. 653,557
Int. Cl.² H01R 13/64
U.S. Cl. 339—186 M 8 Claims



1. A pair of mated electrical connectors comprising:

a housing associated with each connector, each housing having a mating face and an external face;

an oriented polarizing element extending from the mating surface of one housing and engaging in a mated relationship a polarizing element extending from the mating surface of the other housing, each polarizing member having an orientation with respect to each housing;

means for changing the orientation of the polarizing elements on the mated electrical connectors to various predetermined positions while the connectors and polarizing elements remain mated, said changing means comprising:

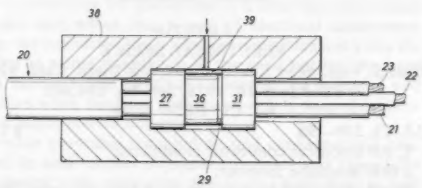
a member carried on at least one of the polarizing elements which extends through the external surface of the housing carrying the polarizing element, and which carries means for reorienting the mated polarizing elements by rotation thereof between said various predetermined positions, whereby the orientation of the polarizing elements on the mated electrical connectors may be changed with respect to each housing without unmating the pair of connectors.

4,032,214

CABLE-TERMINATION ASSEMBLIES AND METHODS FOR MANUFACTURING SUCH ASSEMBLIES

Richard P. McNerney, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Apr. 21, 1976, Ser. No. 678,814
Int. Cl.² H01R 13/50
U.S. Cl. 339—218 M 68 Claims



1. A method for terminating an electrical cable having miltiple conductors respectively enclosed within thermoplas-

tic sheaths collectively arranged within a cable covering and with laterally-separated end portions protruding therefrom comprising the steps of:

introducing a molten thermoplastic around said separated end portions for integrally fusing a unitary fluid barrier around each of said thermoplastic sheaths to block potential leakage paths through said fluid barrier and exterior of said thermoplastic sheaths;

arranging electrical terminals respectively on each of said end portions; and

thereafter sealingly bonding a moldable polymer body around each of said electrical terminals respectively and to at least those surfaces on the forward face of said fluid barrier respectively encircling each of said end portions passing therethrough for blocking other potential leakage paths within said polymer body which are ahead of said fluid barrier and would otherwise intercommunicate the interiors of two or more of said thermoplastic sheaths.

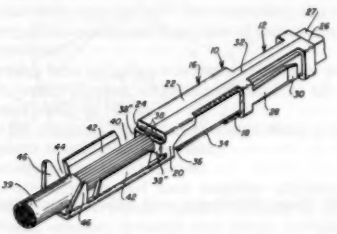
4,032,215
ELECTRICAL CONTACT FOR WIRE AND PIN WITH COMMON STOP

Seymour Jarmofsky, deceased, late of Bethel, Conn.; by Doris F. Jarmofsky, legal representative and heir, and by Nancy H. Jarmofsky, heir, both of Bethel, Conn., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Continuation-in-part of Ser. No. 451,738, March 18, 1974, Pat. No. 3,963,302. This application Mar. 10, 1976, Ser. No. 665,711

Int. Cl.² H01R 13/12

U.S. Cl. 339—258 R **6 Claims**



1. An electrical contact for joining electrically conductive elements, comprising:

a first conductive element;

a box-like end section for receiving said first conductive element formed from a metal sheet having four side walls;

a second conductive element;

an open barrel crimp section for receiving said second conductive element;

a central box section formed by the extension of said four walls of said box-like end section;

one of said four walls further extended for joining said central box section and said open barrel crimp section;

support means formed by the further extension of two of said four walls perpendicular to said four walls having contiguous facing surfaces for strengthening said contact; and

said support means formed by said two perpendicular walls having inner surfaces abutting said first conductive element and outer surfaces abutting said second conductive element to form a stop for said first and second conductive elements whose contiguous surfaces and abutting contact with said first and second conductive elements further strengthens said contact.

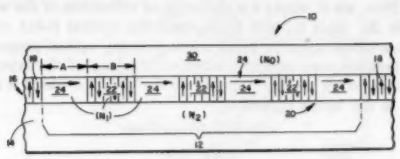
4,032,216
THIN FILM MAGNETO-OPTIC MODE CONVERTERS

Rodney D. Henry, Orange, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 15, 1976, Ser. No. 667,237

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 WG **7 Claims**



1. An optical mode converter comprising:

a substrate and;

a magneto-optical waveguide supported by said substrate and comprising a periodic structure comprised of alternate first and second areas, said first areas having the magnetization therein in the plane of the waveguide and substantially parallel to the direction of propagation and said second areas having the magnetization therein perpendicular to the direction of propagation.

4,032,217
OPTICAL WAVE GUIDE FOR CARRYING OUT PHASE-TUNING BETWEEN TWO MODES OF LIGHT PROPAGATION

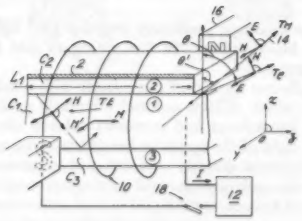
Philippe Coeuré, Grenoble; Jean Pierre Jadot, Meylan, and Jean Claude Peuzin, Eybens, all of France, assignors to Commissariat a l'Energie Atomique, Paris and Agence Nationale de Valorisation de la Recherche, Neuilly-sur-Seine, both of, France

Filed Mar. 24, 1976, Ser. No. 669,883

Claims priority, application France, Apr. 2, 1975, 75.10295

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 WG **11 Claims**



1. An optical wave guide for carrying out phase tuning between two modes of light propagation of waves within said guide, wherein said guide comprises first layer C_1 of optical index n_1, a second layer C_2 comprising a dielectric material having an optical index n_2 ($n_2 < n_1$) which is adjacent to said first layer and has a thickness e_2 determined by the equation:

$$2\left[\operatorname{arctg}\left(\frac{\sqrt{N^2-n_2^2}}{\sqrt{n_1^2-N^2}}\cdot \operatorname{th}\left[\sqrt{N^2-n_2^2}\,e_2\frac{2\pi}{\lambda}\right]\right)\right]+$$

$$\operatorname{Arctg}\left(\frac{\sqrt{N^2-n_3^2}}{\sqrt{n_1^2-N^2}}\cdot\frac{n_1^2}{n_3^2}\right)\Bigg]-2\left[\operatorname{Arctg}\left(\frac{\sqrt{N^2-n_3^2}}{\sqrt{n_1^2-N^2}}\cdot\right.\right.$$

-continued

$$\frac{1}{\text{th}\left(\sqrt{N^2-n_3^2}\,\varepsilon_2\,\frac{2\pi}{\lambda}\right)}\Bigg\} + \text{Arctg}\,\frac{\sqrt{N^2-n_3^2}}{\sqrt{n_1^2-N^2}}\Bigg] = 0$$

with $N=n_1 \sin\theta$, where θ is the angle of refraction of the waves within the layer C_1 and n_3 ($n_3<n_1$) the optical index of the volume below layer C_2; and a coating having optical properties of a metallic type and deposited on the face of the layer C_2, said face being located opposite to the flat face which is common to the layers C_1 and C_2.

4,032,218

DEVICE FOR THE PRODUCTION AND MODULATION OF MONOCHROMATIC LIGHT

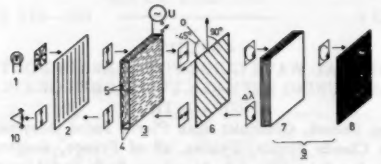
Terry J. Scheffer, Wettingen, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed May 27, 1975, Ser. No. 581,082

Claims priority, application Switzerland, June 7, 1974, 7792/74

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **12 Claims**



1. In a device for the production and modulation of colored light from light emanating from a suitable source by means of a liquid-crystal electro-optical cell coated with electrodes and combined with a polarizing arrangement and a reflector, the liquid crystal exhibiting a helically twisted structure with a twisting angle of at least approximately 90° along the direction normal to the film-like electrodes, the improvement comprising:

a linear polarizer positioned between said light source and said liquid-crystal cell and acting as said polarizing arrangement,

said reflector formed of a substance with a helicoidal structure which reflects colored circularly polarized light of one handedness and transmits colored circularly polarized light of the opposite handedness and a light absorbing material directly adjacent said substance; and,

a circular polarizer formed of a quarter-wave plate positioned between said liquid-crystal cell and said reflector.

said quarter-wave plate directly adjacent to said liquid-crystal cell on the side facing said reflector and, said substance with a helicoidal structure placed directly adjacent to said quarter-wave plate to minimize undesirable effects due to parallax.

4,032,219

LIQUID CRYSTAL DISPLAY DEVICES

Jennifer Constant; Ian Alexander Shanks, and Edward Peter Raynes, all of Worcester, England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britian and Northern Ireland, London, England

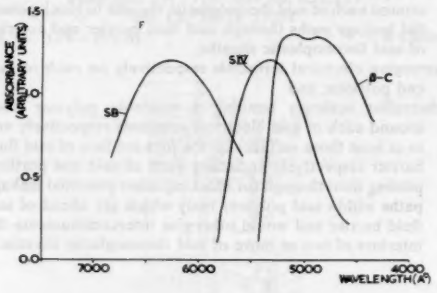
Filed Oct. 17, 1975, Ser. No. 623,506

Claims priority, application United Kingdom, Oct. 21, 1974, 45495/74

Int. Cl.² G02F 1/16; C09K 3/34

U.S. Cl. 350—160 LC **9 Claims**

1. A liquid crystal display device comprising a layer of liquid crystal material, a dye dissolved in said liquid crystal material, and means for applying across said layer an electric field capable of changing the optical transmissivity of a least a part of said layer, wherein the improvement comprises said dye being formed of a mixture of at least three colored dye compounds one of which is blue, one of which is red and one of which has a color between blue and red, said mixture providing an overall gray color in the absence of an applied electric field.



4,032,220

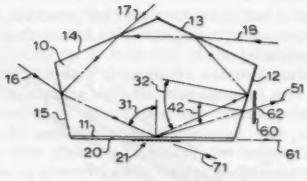
LIGHT OPTIC DATA HANDLING SYSTEM

Joseph T. McNaney, 8548 Boulder Drive, La Mesa, Calif. 92041

Filed Mar. 1, 1976, Ser. No. 662,848

Int. Cl.² G02F 1/34

U.S. Cl. 350—161 W **11 Claims**



1. Light beam distributor and reflection control means, comprising:

a. at least first and second light admitting surfaces:

b. at least first and second sources of light;

c. means for directing light from said first and second sources along corresponding first and second input paths and, respectively, toward said first and second admitting surfaces and thereupon along a primary optical path within said distributor while undergoing a series of light reflections therein so as to establish an availability of light from said first and second sources at a plurality of predetermined light output positions of said distributor for an optically controlled redirecting of light along a selected one of a plurality of secondary paths stemming from said output positions;

d. said means for directing the light along said primary path including an array of light reflecting interfaces of first and second light conducting media presenting, respectively, first and second indices of refraction, each of said interfaces presenting a length dimension and each angularly oriented so as to establish an optical relationship one with respect to the other, with respect to said input paths, and with respect to said secondary paths, said array of interfaces providing a series of 360° primary optical paths for said light, each said 360° path displaced one with respect to the other in a side-by-side relationship in the direction of said length dimension;

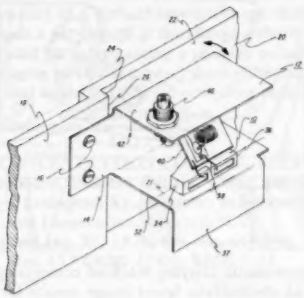
e. said output positions extended along said length dimension coincident with a predetermined one of said interfaces of first and second light conducting media of said array of interfaces;

f. light reflection control means positioned along said length dimension for effecting, selectively, a redirecting of light of said first and second sources along a secondary path stemming from a corresponding output position thereof.

4,032,221
MOUNTING ARRANGEMENT FOR ACOUSTO-OPTIC MODULATORS

John S. Bibb, Indialantic, and Elliot N. Tompkins, Melbourne Beach, both of Fla., assignors to Harris Corporation, Cleveland, Ohio

Filed Mar. 22, 1976, Ser. No. 669,005
Int. Cl.² G02F 1/16
U.S. Cl. 350—161 W **12 Claims**



1. A mounting arrangement for controlling the position of an acousto-optic modulator in a beam of radiation comprising in combination:

a mounting base including a substantially planar portion and an indented portion, wherein said portions are separated by a plurality of bends:

means for directing a beam of radiation along a path that is adjacent to said planar portion;

a generally planar base member;

means for securing said base member, adjacent one end thereof, to said planar surface portion in an abutting coplanar relation, between said planar portion and said beam of radiation, and with a portion of the base member extending beyond said bend;

adjustment means connected to said member adjacent the other end of said base member and engaging said indented portion, said adjustment means being adapted to apply forces to said base member to pivot the portion of said base member extending beyond said bend, and

means for mounting an acousto-optic modulator to said base member so that said acousto-optic modulator extends into said beam and is movable along a plane including said beam in response to said adjustment means.

4,032,222
CONTROLLED REFLECTION READOUT FOR DIGITAL DISPLAYS

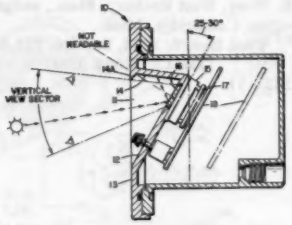
James M. Lapeyre, New Orleans, La., assignor to Digicourse Inc., New Orleans, La.

Continuation-in-part of Ser. No. 527,121, Nov. 25, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 670,965
Int. Cl.² G02B 17/00
U.S. Cl. 350—276 R **11 Claims**

1. A self illuminated readout having a glare and reflection control for ambient light comprising:

a. a casement having viewing opening therein for viewing inside a casement front plane,

b. a light emitting display unit positioned inside said casement in view of said opening disposed in a second plane inclined at an angle of the order of 25° to 60° to said front plane, and

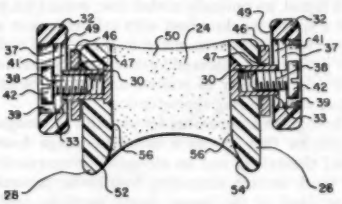


c. view limiting shield means carried by said casing and positioned in the light path between the light emitting display and an observer so that the viewing angle is restricted to less than 90° relative to the plane of said display unit thereby to eliminate reflections of external objects from the display unit.

4,032,223
OPHTHALMIC DEVICE

James B. Bradley, Jr., 110 Monteleon Drive, West Monroe, La. 71291

Filed May 2, 1975, Ser. No. 573,907
Int. Cl.² G02C 1/00, 5/02
U.S. Cl. 351—132 **3 Claims**



1. An ophthalmic device comprising

a. a pair of lens mounts, each lens mount having a lug formed thereon, said lugs each having a pair of colinear juxtaposed vertical slots formed therein to allow for vertical adjustment of a nosepiece a wider one of the two slots on each lug being on the interior side thereof;

b. a bridge, spanning said lens mounts and rigidly attached thereto;

c. a pair of temples, hingedly attached to said lens mounts;

d. a removable and replaceable one piece nosepiece positioned between said lens mounts and beneath said bridge;

1. a pair of female receptacles imbedded fixedly in said nosepiece, the female receptacles extending outward from the sides of said nosepiece into the wider of the two slots in said lens mount lugs to retain the nosepiece between the lens mounts;

2. a pair of screws each extending through the other of the two slots in said lens mount lugs and into the female receptacles;

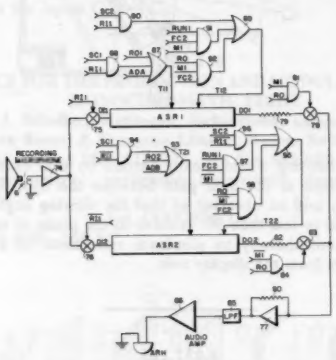
3. a frictional member positioned between said lens mount lugs and said nosepiece for frictionally restraining relative rotational movement between said one piece nosepiece and said lens mounts whenever said screws are tightened in said female receptacles; and

4. said female receptacles also extending through said frictional members.

4,032,224
SOUND RECORDING AND REPRODUCING SYSTEM FOR SOUND MOTION PICTURE PHOTOGRAPHY

William R. Wray, West Roxbury, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 7, 1974, Ser. No. 521,839
Int. Cl.² G03B *31/02*
U.S. Cl. 352—11 **6 Claims**



1. Means for reproducing a signal recorded at variable speed on a magnetic recording medium while moving the recording medium at variable speed, comprising a transducer, transport means for cyclically moving the recording medium at varying speeds past said transducer and then stopping the recording medium, an amplifier connected to said transducer and having a gain dependent on an applied automatic gain control signal, an optically coded disc, means for moving said disc at a speed synchronized with said transport means, and photoelectric means responsive to the optical coding of said disc to produce an automatic gain control signal to adjust the gain of said amplifier to remove amplitude variations in the recorded signal during reproduction.

2. Photographic apparatus for use with an elongated strip of photographic film having a series of image frame sections disposed therealong and an elongated magnetically recorded sound track section extending lengthwise therealong correlated to each of the image frame sections, said apparatus comprising:

an image porjection station;

means for intermittently imparting motion to progressive intermediate portions of the film strip adjacent said station to sequentially advance the image frame sections into a position at rest in operative relationship to said station;

means for rendering said station operative to perform its intended photographic operation relative to the image frame sections as they are sequentially positioned at rest in operative relationship with respect to said station by said intermittent imparting motion means;

audio information retrieving means for monitoring said elongated sound track and deriving periodic signals of electrical information therefrom during periods of said intermittent motion, said retrieving means including means for storing samples of said intermittently derived signals and for thereafter transcribing said stored samples into continuous audio information in correspondence to the photographic operations performed on respective frame sections subsequent to said periods of intermittent motion, said information retrieving means also including means for providing a first signal indicative of the complete transcription of at least a select portion of the samples stored by said sample storing means,

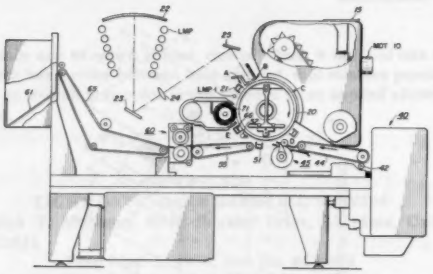
means for monitoring the motion of said motion imparting means and for providing a second signal representative of a particular point in said intermittent motion, and

speed control means responsive to said first and second signals for controlling the speed of said motion means so that said particular point in said intermittent motion substantially coincides with the complete transcription of all the samples stored in said select portion of said sample storing means.

4,032,225
COPYING MACHINES

Geoffrey C. Williams, Rochester, N.Y., assignor to Rank Xerox Ltd., London, England

Filed Aug. 25, 1975, Ser. No. 607,644
Claims priority, application United Kingdom, Sept. 24, 1974, 41466/74
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 DD **1 Claim**



1. An electrostatic copying machine comprising means for producing an electrostatic latent image, means for developing the latent image, means for transferring the developed image to support material, means for feeding sheets of support material to the transfer means, and means responsive to the feeding means for replenishing developer material in accordance with the number of sheets fed to the transfer means, the replenishing means including:

a. a motor for controlling the flow of developer material from a reservoir;

b. detection means actuatable for a first predetermined period on the feeding of each sheet to the transfer means;

c. first relay means having a normally open first switch in series with the motor;

d. means for actuating the first relay means after the detection means has been actuated a given number of the first predetermined periods to close the first switch for a second predetermined time;

e. a normally closed second switch in series with both the motor and the first switch; and

f. means responsive to the closing of the first switch for opening the second switch after a third predetermined time has elapsed.

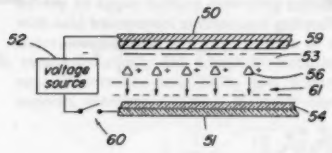
4,032,226
PHOTOIMMOBILIZED ELECTROPHORETIC RECORDING

Carl F. Groner, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 607,650, Aug. 25, 1975, Pat. No. 3,976,485, which is a continuation-in-part of Ser. No. 510,848, Sept. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 425,044, Dec. 14, 1973, abandoned. This application Mar. 22, 1976, Ser. No. 668,885
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 P **23 Claims**

1. In an imaging apparatus for use in a migration imaging process, said apparatus comprising (a) two spaced electrodes adapted to receive electrically photosensitive particles, at

least some of which bear a positive polarity electrostatic charge, disposed therebetween, one of said electrodes bearing a blocking layer on a surface thereof adapted to contact said particles, and (b) means for substantially simultaneously creating an electric field between said electrodes and exposing said photosensitive particles to activating radiation, the improvement wherein the electrode opposite said electrode



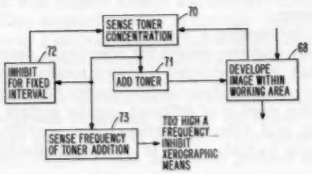
bearing the blocking layer has as an overcoat for a surface thereof adapted to contact said particles a uniform layer comprising an amount of a dark charge exchange material sufficient to provide a net change in the charge polarity of at least a portion of said particles bearing a positive polarity electrostatic charge upon electrical contact therewith in the presence of said field and in the absence of activating radiation.

4,032,227

TONER CONCENTRATION CONTROL APPARATUS

James H. Hubbard, Boulder County, Colo., and George W. Van Cleave, Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,390
Int. Cl.² G03G *15/00*; B05B *5/02*
U.S. Cl. 355—14 **25 Claims**



17. Toner concentration control apparatus comprising:

a toner concentration sensor providing a cyclic output signal when a need to add toner is sensed;

an integrating counter connected to integrate said cyclic output signal and to provide an add-toner signal upon said integrating counter reaching a preset high-count state;

a periodic signal, of a frequency lower than said cyclic output signal, connected to reset said integrating counter;

inhibit means controlled by said add-toner signal and operable to inhibit operation of said toner concentration sensor for a preset interval; and

a failure-sensing counter incremented by said add-toner signal and operable to provide a failure output when a preset number of said add-toner signals occurs in an interval spanning a number of said periodic signals.

4,032,228

FOREIGN OBJECT DETECTOR/BRUSH CLEANER

Charles A. Whited, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 27, 1974, Ser. No. 483,868
Int. Cl.² G03G *21/00*
U.S. Cl. 355—15 **1 Claim**

1. An improved reproduction machine having means defining a support surface on which an image may be formed, means for moving the support surface around a closed path, means for forming a developed image on the support surface, means for transfering the developed image to a transfer member, and means including a housing having an opening and a brush mounted for rotation within the housing and extending through the opening for cleaning the support surface after the developed image has been transferred and before another

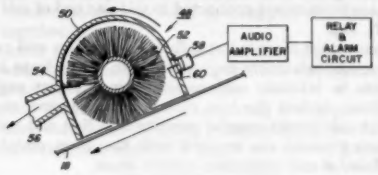


image has been formed on the same portion of the support surface, the improvement comprising:

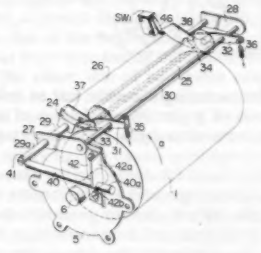
means including a crystal pickup and a probe disposed immediately adjacent to the periphery of the brush for detecting the presence of a transfer member within the housing.

4,032,229

CONSTRUCTION OF ELECTROPHOTOGRAPHIC COPYING MACHINES WITH A CLEANING UNIT FOR PHOTOSENSITIVE SURFACE

Tatsuo Tani, formerly Nishikawa, Tokyo; Susumu Tatsumi, Kawasaki; Mitsuo Tanaka, Sagamihara; Sakae Ota, Tokyo, and Akira Midorikawa, Yokohama, all of Japan, assignors to Ricoh Co., Ltd., Japan

Filed Jan. 9, 1976, Ser. No. 647,813
Claims priority, application Japan, Jan. 14, 1975, 50-6713
Int. Cl.² G03G *21/00*
U.S. Cl. 355—15 **9 Claims**



1. A construction of electrophotographic copying machines comprising:

a. a photosensitive drum,

b. a pair of sidewalls rotatably mounting said drum therebetween, one of said sidewalls having an opening to permit the drum to pass therethrough;

c. a coverplate detachably mounted on said one sidewall to cover said opening,

d. first and second cleaning means, extending across said drum between said sidewalls for movement between respective first positions in engagement with said drum and respective second positions spaced from said drum, said cleaning means in said first positions, engaging said drum at respective contact areas, which are circumferentially spaced from each other,

e. first and second lever means pivotally mounted between said pair of sidewalls on respective shafts extending between said pair of sidewalls, for respectively supporting said first and second cleaning means, one end of one shaft extending through and beyond one sidewall,

f. means interlocking said first and second lever means for conjoint movement,

g. spring means biasing one of said first and second lever means to move, through said interlocking means, both said first and second cleaning means away from the drum peripheral surface,

h. release lever means connected to said one end of said one shaft, and

i. detent means mounted at a fixed position on said cover plate, and releasably engageable with said release lever means to maintain said one shaft in a preset angular position, against the bias of said spring means, and in which said preset angular position said first and second cleaning means are engaged with the drum peripheral surface, at said respective contact areas.

4,032,230

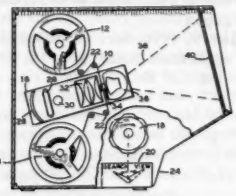
HIGH SPEED MICROFILM SEARCHING SYSTEM

Matthew Shipman, New York; Richard Hess, Rye; Burton Kaufman, New York, and Bruce H. Schneider, Douglaston, all of N.Y., assignors to General Computing Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 441,049, Feb. 11, 1974, Pat. No. 3,895,865. This application July 21, 1975, Ser. No. 597,766

Int. Cl.² G03B *27/52*

U.S. Cl. 355—42 **12 Claims**



1. A system for recording a marker and an index together with data on each of a plurality of frames of a microfilm, wherein the data is stored as digital signals on a tape, comprising:

a. visual display means for displaying the data on a screen;

b. computer means responsive to the data on the tape for converting the data to human readable characters for display on the screen, and for generating a human readable index for display on the screen, for each of the frames on which data is to be optically recorded;

c. unexposed film source means positioned adjacent the screen of said visual display means for optically recording the data in a plurality of frames;

d. marker recording means; and

e. control means for recording on a given frame, the data, a marker and an index so that the marker is always recorded in a predetermined position on the frame with respect to the index on that frame.

9. A metod of transferring data from magnetic tape to optical film with a marked indicia index for retrieval of said data comprising the steps of exposing a plurality of groups of data frames, each of said groups corresponding to a single film indexing position, generating a series of index indicia, each applicable to one of said groups, applying each of said index indicia to one frame of each of said groups, counting each of said index indicia during application thereof, generating a series of sensing markers, and applying one of said sensing marker to each of said one of said frames containing said index indicia at the same predetermined position relative to said index indicia in each of said one of said frames.

4,032,231

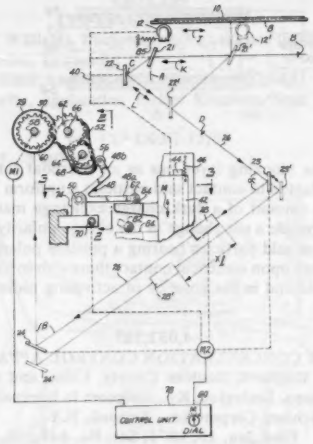
MULTIPLE RANGE VARIABLE MAGNIFICATION REPRODUCTION MACHINE USING THREE-DIMENSIONAL CAM

Edwin Zucker, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 3, 1976, Ser. No. 682,809

Int. Cl.² G03B *27/54*

U.S. Cl. 355—60 **22 Claims**



1. A variable magnification reproduction machine for providing a continuously variable range of document magnifications comprising:

a. a platen for imaging a document,

b. document scanning means for scanning a document at said platen, said document scanning means comprising:

1. an effectively continuous cam surface having an axially extensive portion of different angular surface configurations, said different configurations providing a continuously variable range of document scanning rates, and

2. cam follower means for contacting said cam surface, for controlling the scanning rate and scanning distance of said document scanning means with said cam surface by movement of said cam surface relative to said cam follower means,

c. image receptor means for receiving an image of said document scanned by said document scanning means,

d. imaging means for focusing an image of said document onto said receptor means,

e. means for adjusting said imaging means for selecting between different document magnifications, and

f. means responsive to the selected magnifications for selecting one of said angular surface configurations for said contact by said cam follower means.

4,032,232

MOVABLE COPY BOARD FOR REPRODUCTION APPARATUS

Horst Perthes, Neuenhain, Taunus, Germany, assignor to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany

Filed Oct. 11, 1973, Ser. No. 405,547

Claims priority, application Germany, Oct. 13, 1972, 7237610[U]

Int. Cl.² G03B *27/62*

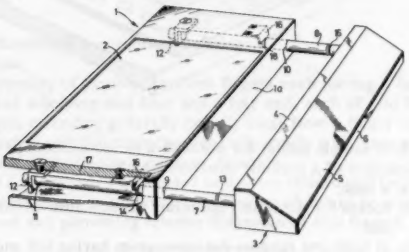
U.S. Cl. 355—75 **3 Claims**

1. In a scanning-type photographic duplicating machine having a fixed copying station including a stationary light source and a movable document supporting frame for supporting and transporting an original document to be copied

across said copying station, said frame being supported on said machine for reciprocal movement adjacent fixed structure of the machine, and further including an outer, longitudinal side edge portion extending generally parallel to the scanning direction of said frame and a transparent, planar surface for supporting said document; the improvement comprising:

a. an auxiliary, adjustable document support member carried by and movable with said frame, said auxiliary support member comprising an elongated, rigid element having an upper surface extending substantially coplanar with said transparent surface and generally parallel to the outer, longitudinal side edge portion of said frame; and

b. means for rigidly and adjustably securing said auxiliary support member relative to said frame, said auxiliary support member securing means including means for



enabling said auxiliary support member to be laterally displaced relative to said side edge portion of said frame, and rigidly secured with respect to said frame at its laterally displaced position; the upper surface of said auxiliary support member being laterally displaced in a coplanar sense with respect to said transparent surface when said auxiliary support member is laterally displaced;

c. whereby a portion of a document to be copied extending lateraly beyond the longitudinal side edge portion of said frame can be rigidly supported from beneath with respect to said frame independently of adjacent fixed structure of the machine to protect the said document portion from damage and to prevent its inadvertent movement due to contact between said document portion and adjacent fixed structure of the machine during scanning movement of said frame.

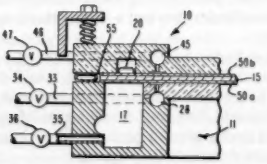
4,032,233
EXPOSURE REGISTRY APPARATUS

Rolf Arne Oscarsson, Pedricktown, N.J., and Nathaniel Convers Wyeth, Mendenhall, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 3, 1976, Ser. No. 682,721

Int. Cl.² G03B 27/20

U.S. Cl. 355—91 **8 Claims**



1. Apparatus for subjecting a phtotsensitive material disposed on a sheet-like support to actinic radiation through an image producing transparency comprising, in combination:

first and second sandwich-like frame assemblies each having opposed surfaces adapted to hold said support and transparency therebetween, at least one of said surfaces being radiation transmitting,

perimeter sealing means for providing an air-tight seal between said assemblies when closed,

first vacuum means defining an aperture for subjecting the enclosed region between said closed assemblies and hence the edges of said support and transparency to a vacuum, thereby to force said support and transparency together,

an inner recess formed in the inner face of said one surface within the confines of said perimeter sealing means and interiorly of said aperture, and

second vacuum means for subjecting said recess to a vacuum, thereby to hold said transparency in position while replacing said support.

4,032,234
PHOTOGRAPHIC DUPLICATORS

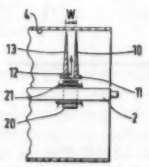
Harry Arthur Hele Spence-Bate, 1 Cheam Place, Morely, Australia (6062)

Filed July 8, 1975, Ser. No. 594,098

Claims priority, application Australia, July 10, 1974, 8153/74

Int. Cl.² G03B 27/22

U.S. Cl. 355—117 **7 Claims**



1. A photographic duplicating apparatus comprising a curved holder for holding a master film and copy film in close proximity to a light source mounted at the centre of curvature of the holder, a curved shutter having a centre of curvature coaxial with that of the holder and light source, said shutter comprising an inner tube and an outer tube mounted coaxially one within the other, one of said tubes adapted for rotary motion relative to the other of said tubes, each of said tubes having a wall aperture whereby rotary motion of one of said tubes causes alignment of said apertures to open the shutter and further rotary motion causes nonalignment of said apertures to close the shutter, means for moving the shutter so as to cut off or allow the light from the source to impinge to a master film, and masking means including a plurality of masking elements, said elements comprising fin-like radial members extending from said outer tube to a point in close proximity to the inner surface of said transparent plate thereby limiting the angle of incidence of light from said tubular lamp striking said films to an angle greater than 80°.

4,032,235
APPARATUS FOR BACKGROUND ABSORPTION COMPENSATION IN SPECTROPHOTOMETERS

Hans Walter Kiefer, Nussdorf; Lothar Herbert Riethmüller, Uhldingen-Muhlhofen, and Ernst Günther Robert Spreitzhofer, Nussdorf, all of Germany, assignors to The Perkin-Elmer Corporation, Norwalk, China /Taiwan

Filed Nov. 24, 1975, Ser. No. 634,928

Claims priority, application Germany, Nov. 30, 1974, 2456713

Int. Cl.² G01J 3/36, 3/42

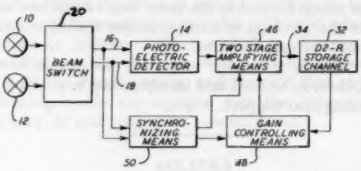
U.S. Cl. 356—82 **10 Claims**

1. In a spectrophotometer of the type wherein readouts compensated for background absorption are provided by sequentially directing radiant energy from each of first and

second sources along sample and reference paths to a photoelectric detector, the improvement comprising:

means for amplifying the photoelectric detector output in separate stages at either a fixed gain or a variable gain;

means for controlling said variable gain of said amplifying means in proportion to the intensity variation of the second source from an optimum level; and



means for synchronizing said stages of said amplifying means and said gain controlling means so that the fixed gain stage occurs over a first interval while energy from the first source is directed to the photoelectric detector and the variable gain stage occurs over a second interval while energy from the second source is directed to the photoelectric detector.

4,032,236

OPTICAL MULTIPLE-REFLECTION ARRANGEMENT

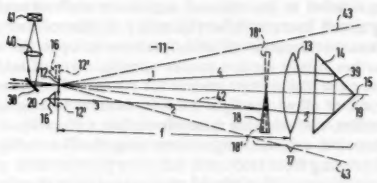
Erwin Sick, Icking, Germany, assignor to Erwin Sick Optik-Elektronik, Waldkirch, Germany

Filed Jan. 28, 1976, Ser. No. 653,152

Claims priority, application Germany, Feb. 28, 1975, 2508860

Int. Cl.² G01N 21/22

U.S. Cl. 356—201 **41 Claims**



1. An optical multiple-reflection arrangement having first and second reflection devices at respective ends of a measurement path and having a light source at one end of the measurement path, the light source and the reflection devices being so constructed and arranged that a light beam starting from the light source passes at least four times through the measurement path before it passes out of the latter, the first reflection device disposed at the end of the measurement path removed from the light source comprising a lens having a focal length equal to its distance from the light source, behind this lens a first retroreflecting element which reflects an incoming light beam in the same direction but offset laterally, and light beam deflection means which impart to at least one of the incoming and outgoing beams of the retroreflecting element a deflection such that the image made of the light source by the reflection device lies at the side of the light source; the second reflection device being a second retroreflector disposed near, and outside the plane of the image made of the light source by the first reflection device.

4,032,237

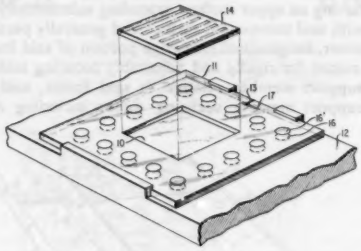
STEREOSCOPIC TECHNIQUE FOR DETECTING DEFECTS IN PERIODIC STRUCTURES

Bela Julesz, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 12, 1976, Ser. No. 675,779

Int. Cl.² G02B 27/22

U.S. Cl. 356—237 **17 Claims**



5. A sample holder for use with a stereomicroscope in the inspection of a periodic structure which comprises:

a. a base;

b. means for removably mounting the structure on the base; and

c. at least one random dot stereogram having left and right images mounted on a top major surface of the base within the field of view of the stereomicroscope and having a binocular disparity between left and right images thereof which is an integral multiple of the periodicity of the structure.

4,032,238

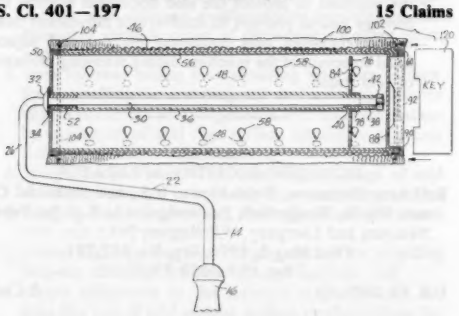
FOUNTAIN PAINT ROLLER

Ragnvald G. Leland, P.O. Box 4174, Palm Springs, Calif. 92262

Filed June 24, 1976, Ser. No. 699,502

Int. Cl.² B44D 3/28

U.S. Cl. 401—197 **15 Claims**



1. A fountain paint roller, which comprises:

an outer cylinder having a first set of apertures formed therein;

an inner cylinder having a second set of apertures formed therein and being disposed within said outer cylinder so as to be rotatable therewithin between a first position wherein said first and second sets of apertures are not aligned and a second position wherein said sets of apertures are substantially aligned;

guide means for constraining the rotation of said inner cylinder between said first and second positions;

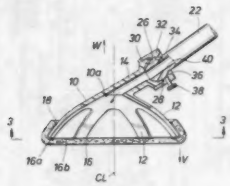
key means for rotating said inner cylinder within said outer cylinder between said first and second positions; and

end closure means for said inner cylinder including means formed therein for receiving said key means so as to be rotatable thereby.

4,032,239
SCRUBBING APPARATUS

Roger A. Maupin, 226 Blue Castle, Houston, Tex. 77015

Filed Sept. 17, 1975, Ser. No. 614,125
Int. Cl.² A47L 1/06
U.S. Cl. 401—203 5 Claims

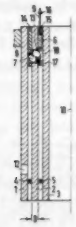


1. Scrubbing apparatus comprising:
a base;
a plurality of flexible, resilient fingers each having a base end adjoining said base and a free end, each of said fingers extending generally radially away from a finger centerline and also extending generally axially with respect to said centerline in a uniform direction;
and a pad member connected to the free ends of said fingers to be urged by said fingers against an object to be scrubbed and permitting relative distension of said fingers.

4,032,240
TELESCOPIC DEVICE

Horst Reinhardt, Weiskirchen, and Ernst Höger, Grosswelzheim, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Mar. 5, 1976, Ser. No. 664,401
Claims priority, application Germany, Mar. 7, 1975, 2510062
Int. Cl.² F16B 7/10
U.S. Cl. 403—108 7 Claims

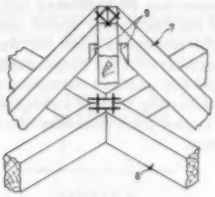


1. Telescopic device comprising a plurality of elongated members disposed one within the other in a fully telescoping retracted condition thereof and including an innermost member, an outermost member and at least one member intermediate thereto, said members being displaceable in longitudinal direction relative to one another in a predetermined sequence, stop means for limiting travel of said members relative to one another, said at least one intermediate member being formed at a wall region located at one end thereof with a recess penetrating therethrough, a locking member disposed in said recess and having a dimension greater than the thickness of said wall region, one of said innermost and outermost members being formed with a depression at the end thereof located, in said fully telescoping retracted position of said members, adjacent the other end of said elongated intermediate members, said locking member, in a extended condition of said intermediate member with respect to said one of said innermost and outermost members, being partly receivable in said depression, a projection extending from the other of said innermost and outermost members, at an end thereof located adjacent to said one end of said intermediate member in said fully telescoping retracted position of said members, said projection at least partly surrounding said locking member, and blocking means located at one side of said projection, and being engageable with said locking member for holding the same in a blocked position located at one side of said wall region of said intermediate member.

4,032,241
CONSTRUCTIONAL ELEMENTS

Derek Thomas Martin, 24 Torwood Road, Khandallah, Wellington, New Zealand

Filed July 1, 1975, Ser. No. 592,216
Claims priority, application New Zealand, July 15, 1974, 174863
Int. Cl.² F16B 12/10
U.S. Cl. 403—173 2 Claims

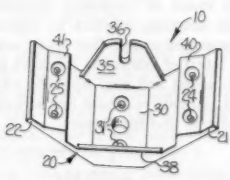


1. A connector for building constructions and the like comprising in cross-section a four-sided box-shaped central portion having fins in pairs projecting outwardly from each of the corners thereof at right angles to each other and at right angles to the adjacent outer surfaces of the central portion, the said fins forming with the adjacent outer surfaces of the central portion four oppositely disposed substantially right-angular longitudinal channels wherein mitred ends of intersecting structural members may be fitted to the channels to engage with the fins and to project substantially at right angles to one another such that the longitudinal axis of the structural members align diagnally with opposite corners of the said central portion.

4,032,242
CORNER JOINT BRACE CHARACTERIZED BY A FLEXIBLE CONSTRUCTION

Max O. Morris, 582 E. Sunset Highway, Issaquah, Wash. 98027

Filed Mar. 14, 1975, Ser. No. 558,281
Int. Cl.² F16B 12/46
U.S. Cl. 403—231 3 Claims



1. A corner joint brace for furniture corner joint members and the like and characterized by a flexible construction for use in bracing a variety of angled corner joint members while providing the desired structural strength for the bracing function, said brace comprising an integral, one-piece flexible and resilient molded plastic body construction including:
a pair of rearwardly and longitudinally extending, oppositely inclined, angularly related, side portions having front and rear surfaces and top and bottom edges for

being positioned with said front surfaces adjacent inside surfaces of the angularly related corner joint members to be braced, said side portions comprising flexible, resilient material;

at least one aperture extending through each of said side portions at a longitudinally extending rearward area only thereof from said rear surface to said front surface thereof for receiving fasteners therethrough for securing said brace to the corner joint members; and

reinforcing top and bottom portions extending respectively between said top edges and between said bottom edges of a longitudinally extending forward area only at the apex of said side portions and forwardly of said apertures for providing structural strength and stability to said brace for the bracing function thereof while allowing retention of the resilience and flexibility of the longitudinally extending rearward area of each of said side portions containing said apertures from said top edges to said bottom edges;

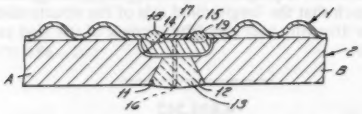
whereby, said brace may be positioned inside the corner joint of furniture and the like having corner joint members of the same or different angular relation for flexing forwardly or rearwardly, if necessary, of the longitudinally extending rearward areas of said side portions containing said fastener apertures for the positioning thereof contiguous with the inside surfaces of the corner joint members when fastened thereto for bracing thereof.

4,032,243

JOINT FABRICATION AND METHOD FOR FORMING THE SAME

Hibbard G. Keifert, Torrance, Calif., and Frank J. Waters, deceased, late of Northridge, Calif. (by Ethel M. Waters, administratrix), assignors to Fansteel Inc., North Chicago, Ill.

Filed Oct. 18, 1976, Ser. No. 733,245
Int. Cl.² F16B *5/8*
U.S. Cl. 403—272 **21 Claims**



1. A wall joint for industrial and chemcial process equipment which comprises:

a. a first base structural layer,

b. a second corrosion resistant layer overlying said first layer,

c. a fusion weld joining edges of said first layer in abutting relation,

d. an inset insert of corrosion resistant material fusion welded in abutting relation to opposed edges of said second layer above said first layer, and

e. an inlay insert of corrosion resistant material underlying said inset insert and said opposed edges of said second layer and recessed into said first structural layer over the fusion weld in said first layer.

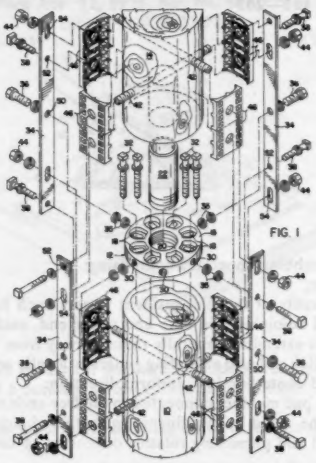
4,032,244

POLE TOP EXTENSION BRACKET

Jackson C. Quayle, 10225 Darrow Road, Twinsburg, Ohio 44087

Filed Apr. 26, 1976, Ser. No. 680,290
Int. Cl.² B25G *3/00*
U.S. Cl. 403—286 **15 Claims**

10. A bracket for connecting a top extension pole member to an existing pole member each having an end portion comprising: a metal plate having parallel planar surfaces and a centrally located shaft member extending perpendicularly outwardly therefrom to be received in at least one corresponding center bore provided in at least one of said pole members; a plurality of reinforcing ribs extending radially outwardly from a central hub of said plate, a plurality of apertures passing through said plate located between said ribs, and fastening



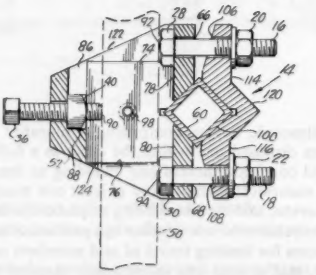
means passing through said apertures for attaching said plate to the end portion of one of said pole members; strap members positioned vertically along the outer surfaces of said pole members and said plate and fastening means for securing said straps to said pole members and said plate to form a unified pole structure.

4,032,245

AGRICULTURAL EQUIPMENT CLAMP

Henry C. Woodruff, Phoenix, Ariz., assignor to Gramor Machine Company, Tolleson, Ariz.

Filed July 9, 1976, Ser. No. 703,847
Int. Cl.² F16B *7/00*
U.S. Cl. 403—385 **15 Claims**



1. An agricultural equipment clamp, which comprises:

a unitary body having means for seating a tool shank and first means integrally formed thereon for seating a tool bar transversely to said tool shank;

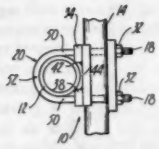
a unitary cap having integrally formed therein second means for seating said tool bar at a position opposite to said first means and first aperture means located near the ends of said cap for receiving means for securing said clamp about said tool bar;

wherein said tool shank seating means comprises said means for securing said clamp about said tool bar.

4,032,246
CLAMP

William A. Waara, Detroit, Mich., assignor to Visi-Trol Engineering Company, Detroit, Mich.

Filed May 10, 1976, Ser. No. 684,872
Int. Cl.² F16B 7/04
U.S. Cl. 403—390 3 Claims



1. For use in combination with a pair of elongated cylindrical members crossing each other at a predetermined angle, a clamp for clamping said members together at their point of intersection, said clamp comprising:

a base disposed between the elongated members at their point of intersection, said base having a first pair of spaced and parallel bar members having a rectangular cross-sectional shape, and a second pair of spaced and parallel bar members having a rectangular cross-sectional shape, said second bar members disposed at said predetermined angle relative to the first pair of spaced and parallel bar members so that a portion of each of said second bar members overlaps and is secured to each of said first bar members, said first and second bar members of said base forming a channel on each side of said base, wherein each of said channels is adapted to receive one of said elongated members therein and wherein the spacing between the pairs of bar members is less than the diameter of the corresponding received cylindrical member,

a fastener having a pair of space and parallel first legs and a second leg disposed across one end of said first legs, said first legs of said fastener being disposed through receiving apertures in said base so that one of said elongated members is entrapped between the second leg of said fastener and said base,

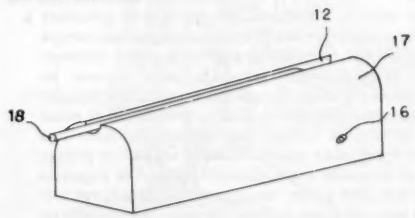
a bar having apertures for receiving the first legs of said bolt member therethrough so that the other elongated member is entrapped between said bar and said base, and

means for securing the first legs of the fastener to said bar.

4,032,247
LOCKABLE WEDGE

Kenneth G. Carter, 175 Virginia, Salt Lake City, Utah 84103

Filed Aug. 16, 1976, Ser. No. 714,594
Int. Cl.² F16B 2/14
U.S. Cl. 403—409 10 Claims



1. A lockable wedge for wedging two parts together in a manner that the wedge cannot be easily dislodged comprising a metal wedge member having a forward face and a rear face, said rear face being vertically thicker than said forward face, and an upper bearing surface tapering from the top of the forward face to the top of the rear face, said upper surface having a longitudinal groove therein extending from a position near said rear face to a position near said forward face, said longitudinal groove intersecting a substantially vertical tubular hole near said rear face, said groove and tubular hole adapted to receive a rod member having one short end bent at a substantially right angle to the remainder of the rod.

4,032,248
ARTICULATED HIGHWAY DELINEATOR POST

Alfred P. Parduhn, 14501 Wilson Road, Oklahoma City, Okla. 73110, and Waldo E. Cecil, P.O. Box 5314, Arlington, Tex. 76011

Filed Nov. 18, 1976, Ser. No. 742,856
Int. Cl.² E01F 9/00
U.S. Cl. 404—10 22 Claims

20. A highway delineator post structure comprising:

an elongated ground post having, in cross-section:

a U-shaped central portion; and

a pair of flanges projecting in opposite directions from said U-shaped central portion;

a slotted tubular sleeve including:

a first wall;

a longitudinally slotted wall opposite said first wall; and

a pair of spaced, longitudinally lobed side walls joining said first wall and said longitudinally slotted wall, said lobed walls each having a lobe projecting outwardly from said tubular sleeve, and each slidingly receiving one of the flanges of said ground post;

means interlocking said sleeve in telescoping engagement with said ground post with said flanges in said interior channels;

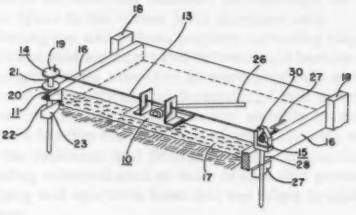
a polygonally cross-sectioned elongated indicator support post having an end portion telescoped into said sleeve, and extending in axial alignment with said ground post; and

means pivotally engaging said sleeve and said indicator support post for pivotation of the indicator support post about a horizontal axis, and for extension of the support post, upon pivotation from the pivotal axis thereof, through the slot in said slotted wall.

4,032,249
APPARATUS FOR GROOVING CONCRETE

Louis DeVitis, Millstone Road, Perrineville, N.J. 08835

Filed Nov. 12, 1976, Ser. No. 737,441
Int. Cl.² E01C 23/02
U.S. Cl. 404—89 7 Claims



1. In apparatus for grooving wet mortar or the like, the combination comprising:

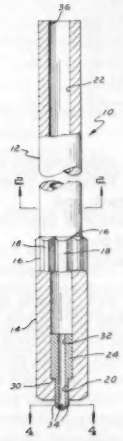
A guide assembly comprising a cable extending between a drum assembly and a ratchet assembly wherein said drum and ratchet assemblies include spacer means for mounting said cable a predetermined height above said mortar and said ratchet assembly includes means for tensioning said cable so as to form a guide wire; and

a float assembly comprising float means for imparting a groove to said mortar when slid across the surface thereof and track means for slidably engaging said cable.

4,032,250
REAMER CONSTRUCTION

John A. Lavallee, Hatfield, Mass., assignor to Lavallee & Ide, Inc., Chicopee, Mass.

Filed Mar. 17, 1976, Ser. No. 667,687
Int. Cl.² B23B 51/06
U.S. Cl. 408—59 4 Claims

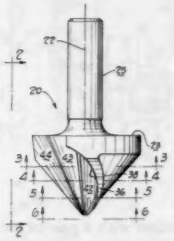


1. In a reamer comprising a shank and a cutting portion adjacent one end thereof, the improvement which comprises a pilot hole axially disposed in said shank in the cutting portion end thereof, a fluid passage axially disposed throughout the remainder of said shank communicating with said pilot hole, and fluid dispersing means disposed in said fluid passage and having a portion thereof extending through said pilot hole to a point outside of said shank said dispersing means being freely and wholly displaceable into said shank.

4,032,251
COUNTERSINKING AND DEBURRING TOOL

Thomas Anthony Ribich, Cleveland, Ohio, assignor to The Weldon Tool Company, Cleveland, Ohio

Filed May 5, 1975, Ser. No. 574,389
Int. Cl.² B23B 51/10
U.S. Cl. 408—199 16 Claims

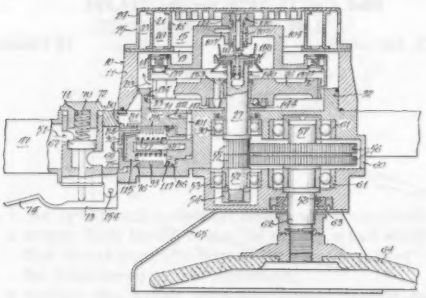


1. A countersinking tool having an axis of rotation and comprising a shank portion, a cutting portion integrally connected to said shank portion and including a generally tapered body having a generally conically shaped reference surface, wall means extending generally radially into said tapered body and defining a curved cutting face wall, said curved cutting face wall extending substantially on the arc of a circle, a relieved land surface extending to and meeting said cutting face wall to define a curved cutting edge, said curved cutting edge located substantially on said conically shaped reference surface of said tapered body, a lateral support member located generally diametrically opposed to said curved cutting edge, said lateral support member having a curved support surface with only a portion thereof located substantially on said conically shaped reference surface of said tapered body, said tapered body being recessed rotatively ahead of said cutting edge to said lateral support member and rearwardly of said cutting edge to said lateral support member, and a chip breaking wall integrally connected to said tapered body and extending transverse to said cutting face wall.

4,032,252
PRESSURE GAS ENGINE

Aldo F. Ceresa, Boynton Beach, Fla., assignor to Hollymatic Corporation, Park Forest, Ill.

Filed June 10, 1976, Ser. No. 694,893
Int. Cl.² F01B 25/06
U.S. Cl. 415—25 6 Claims



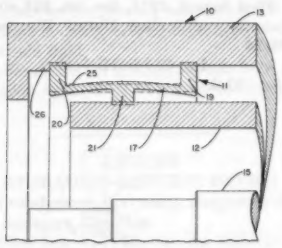
1. A pressure gas engine, comprising: a rotor having energy conversion means thereon for converting dynamic gas pressure to power; gas passage means to said energy conversion means; control means for said pressurized gas comprising a valve seat in said gas passage and a force movable valve movable toward and away from said seat to control and meter the

gas flow through said passage, said force movable valve comprising an expansible and retractable bellows having a hollow interior and a chamber surrounding the bellows in which the bellows is located; first gas flow means for diverting a portion of said pressurized gas to the interior of said bellows; second gas flow means for diverting a portion of said pressurized gas to the chamber surrounding said bellows; a pressurized gas vent passage means leading from said bellows interior and including a vent valve seat; a movable vent valve member movable into and away from engagement with said vent valve seat for metering gas flow through said vent passage; centrifugally responsive means rotatable by said rotor for moving the vent valve member toward said vent valve seat on increasing speeds of said rotor and away from said seat on decreasing speeds, said centrifugally responsive means comprising a spring member having a weighted centrifugally responsive portion arranged at an angle to said vent valve member for urging the valve member toward vent closing position on outward centrifugally responsive movement of said angled portion under increasing centrifugal forces; and a mounting member rotatable with said centrifugally responsive member and including means thereon for supporting the said angled spring member at maximum speeds for preventing damage thereto due to excessive centrifugal forces.

4,032,253
COMPENSATING RING FOR A ROTARY MACHINE

Robert G. Ryncosky, Jeannette, and Alexander A. Carroll, Greensburg, both of Pa., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Sept. 11, 1975, Ser. No. 612,392
Int. Cl.² F01D *25/26*
U.S. Cl. 415—136 **2 Claims**



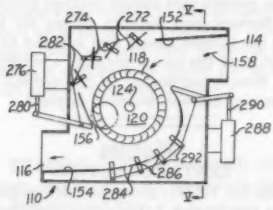
1. In a rotary machine having an inner casing coaxially aligned within an outer casing to provide an annular space therebetween, the space being pressurized under operating conditions whereby the adjacent walls of the two casings are moved apart due to thermal growth and pressure expansion, the improvement comprising

a centering ring positioned within the annular space for supporting the two casings in coaxial alignment about a common axis as the casings move apart, the ring including an annular axial extending resilient beam coaxially aligned with the casings, two end members supporting the beam in a deflected condition therebetween whereby the end members are securely seated in holding contact against one of the adjacent casing walls, the beam being arranged to react uniformly when unloaded in a direction towards the other adjacent casing wall, and an annular reaction pad centrally located along the axial length of the beam on a side opposite to that upon which the beam is seated upon the end members and being arranged to move into holding contact against said other adjacent wall casing to deliver a uniform holding force thereupon to hold the two casings in centered alignment as they move away from each other during periods of thermal growth and pressure expansion.

4,032,254
REVERSIBLE CROSS FLOW BLOWER

Erwin John H. Bentz, Washington, and Paul Julius Staebler, Dunlap, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 20, 1975, Ser. No. 623,888
Int. Cl.² F04D *5/00*
U.S. Cl. 415—54 **7 Claims**

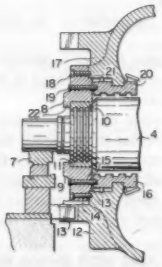


1. In a transverse flow blower having a housing defining an inlet and an outlet, a drum shaped impeller having a plurality of curved blades mounted thereon, said housing comprising a generally rectangular duct having inlet and outlet ends and a housing drum, said housing drum defined by a pair of cylindrically shaped side wall portions joined by a pair of disks so as to define an interior space enclosing said impeller, means rotatably mounting said impeller with respect to said housing so that rotation thereof causes flow of fluid from said inlet to said outlet, said means for rotatably mounting said impeller comprising an elongated shaft and support bearings, and bearings on said shafts rotatably mounting said housing drum relative to said inlet and outlet ends whereby rotation of said housing drum approximately 180° causes said shrouds to be repositioned approximately 180° for fluid flow reversal, means in said housing drum defining volute walls comprising a pair of curved shrouds, each one of said shrouds being mounted on a respective one of said of cylindrically shaped sidewalls and means for reversing the direction of fluid flow while maintaining the direction of rotation of said impeller, said means comprising power means for rotating the housing drum and thereby said volute walls approximately 180°, said power means comprising a hydraulic cylinder attached to one of said ends and a rod actuator connected to said housing drum for selective rotation thereof about said shaft by said power means.

4,032,255
TURBINE ROTOR HOLDING DEVICE

Nobuyuki Iizuka; Yasuhiko Otawara, and Satoshi Ninomiya, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 3, 1975, Ser. No. 546,808
Claims priority, application Japan, Feb. 6, 1974, 49-14464
Int. Cl.² F01D *25/24*; **B65D** *85/68*
U.S. Cl. 415—219 R **8 Claims**



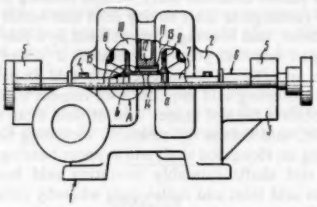
1. A device for holding a turbine rotor of a steam turbine of

the type having turbine wheels provided on a turbine rotor, a turbine casing through which, at the end portions thereof, the turbine rotor extends, and bearing means mounted at the turbine rotor; the improvement comprising means for holding the turbine rotor including an inner ring, an outer ring for supporting said inner ring, said inner ring being provided with a surface complementary to a portion of the turbine rotor constituting a steam leakage preventing means disposed between the location of said bearing means and the turbine casing so as to protect said stream leakage preventing means when fitted thereon; and fastener means for securing said outer ring to the turbine casing and adapted to be removed during operation of the steam turbine, whereby the turbine rotor can be directly supported on the turbine casing when said bearing means are not mounted in place.

4,032,256
CENTRIFUGAL PUMP

Viktor Arsentievich Tatkov, prospekt Tsiolkovskogo, 67 kv. 9, and Nikolai Nikolaevich Letov, ulitsa Transportnaya, 105, kv. 81, both of Novokuznetsk, Kemerovskoi oblasti, U.S.S.R.

Filed Nov. 14, 1975, Ser. No. 632,169
Int. Cl.² F04D *17/08*
U.S. Cl. 415—198.1 **4 Claims**



1. In a centrifugal pump having a casing, a shaft mounted in said casing, impellers mounted on said shaft in a fixed position relative to each other and secured on the shaft for rotation therewith and spacer means on said shaft between said impellers for engaging said impellers to hold the same said shaft at the points of mounting of said impellers has tapered surfaces whose apices face each other, the mating surfaces of said impellers also being tapered, at least one of the tapered surfaces of said shaft being formed by a bushing on said shaft, and means mounting said bushing on said shaft with the provision for axial movement in operation in order to press the impellers against the corresponding tapered surfaces of the shaft.

4,032,257
MILL, PARTICULARLY WINDMILL

Hendrik Antoon Lorentz de Haas, Loenersloot, Netherlands, assignor to B.V. vuro vorr Wetenschappelijke en Techische Ontwerpen Wto, Breukelen, Netherlands

Filed Dec. 9, 1975, Ser. No. 639,173
Claims priority, application Netherlands, Dec. 11, 1974, 7416097
Int. Cl.² F03D *3/06*
U.S. Cl. 416—117 **15 Claims**

1. A windmill, intended to be driven by a flow of fluid, comprising

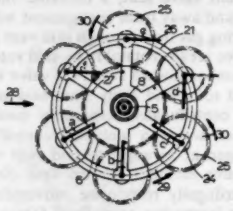
a stationary frame having a central axis;

a vane rotor rotatably mounted in said frame coaxially with said central axis;

a plurality of vane shafts rotatably mounted in said vane rotor in a circular array about said central axis;

a plurality of vane members each fixedly secured to one of said vane shafts for rotation therewith with respect to said vane rotor, each vane member having at least a major portion thereof extending to one side of its associated vane shaft;

a plurality of vane stop means on said vane rotor each associated with one of said plurality of vane members for defining an operating position of each vane member in engagement with its associated stop means whereby, when orienting the mill in a flow of fluid with said frame axis perpendicular to the direction of flow, said fluid flow will swing some of said plurality of vane members about their vane shafts to their operating positions to drive said vane rotor and will tend to swing the remaining vane members to a position parallel to said flow;



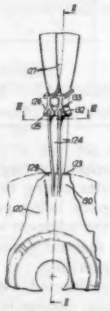
an annular member fixedly secured to said frame coaxially with said central axis, said annular member comprising a circular gear track; and

a plurality of gear means supported by said vane rotor and coupled to one of said plurality of vane shafts, respectively, each of said gear means including a unidirectional free-wheel clutch means, and each of said gear means engaging said circuar gear track, the transmission ratio between each gear means and said gear track being greater than one.

4,032,258
BLADED ROTOR FOR FLUID FLOW MACHINES

Leonard Stanley Snell, Alveston, England, assignor to Rolls-Royce (1971) Limited, England

Filed June 9, 1975, Ser. No. 585,406
Claims priority, application United Kingdom, June 26, 1974, 28299/74
Int. Cl.² F01D *5/30*
U.S. Cl. 416—193 A **4 Claims**



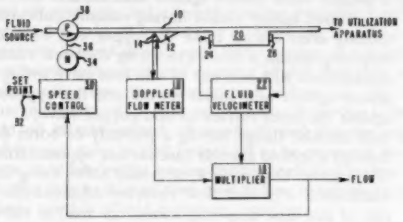
1. A bladed rotor for fluid flow machines comprising a single disc, an annular array of blade support elements situated radially outwardly and spaced from the periphery of the disc, the elements being elongate in a direction across said periphery, each element having end portions overhanging the respective sides of the disc, a web extending between each said element and the disc, each web also extending generally transversely to the plane of the disc and having near the periphery of the disc two portions extending radially along the respective sides of the disc, said webs and said portions thereof being a single integral whole with the disc, each blade having a root portion comprising two parallel portions disposed at opposite sides of the associated blade support element, the confronting surfaces of the parallel portions each

have a recess, and the blade support element has lateral projections engaging the recesses to support a blade against radially outward movement.

4,032,259
METHOD AND APPARATUS FOR MEASURING FLUID FLOW IN SMALL BORE CONDUITS

Alvin E. Brown, Claremont, Calif., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 8, 1976, Ser. No. 647,497
Int. Cl.² F04B *49/00;* **G01F** *1/66*
U.S. Cl. 417—43 **6 Claims**



1. A meter for measuring fluid flow rate in a small bore conduit comprising, in combination,

a Doppler effect flowmeter secured to said conduit for providing a flow signal related to fluid flow rate in said conduit but which varies as a function of sound speed in said fluid,

a static chamber, having a flow cross-section significantly larger than the flow cross-section of said conduit, connected in series with said conduit,

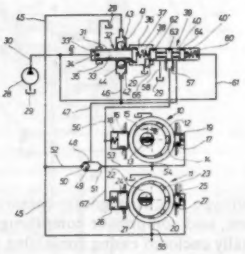
a fluid velocimeter cooperating with said static chamber for generating a sound speed signal related to the speed of sound in said fluid,

and multiplier means for multiplying said flow signal by said sound speed signal to correct said flow signal for sound speed.

4,032,260
HYDRAULIC CONTROL DEVICE

Paul Bosch, Ludwigsburg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 4, 1976, Ser. No. 655,215
Claims priority, application Germany, Feb. 12, 1975, 2505778
Int. Cl.² F04B *1/06;* **F16D** *31/02*
U.S. Cl. 417—216 **23 Claims**

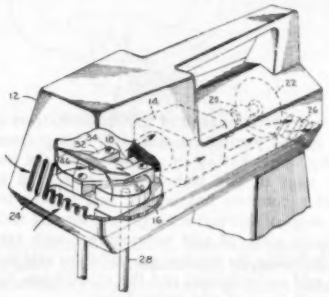


1. A device for protecting a drive from excess loading conditions, comprising a housing; a pressure-responsive control slide mounted for movement relative to said housing; transporting means for transporting fluid, said transporting means being connected to a drive so as to normally load the latter and having adjusting means for controlling the quantity of fluid transported by said transporting means; means for generating a pressure force which is indicative of the rpm of the drive at respective normally loaded conditions and which is operative for moving said control slide towards respective positions each of which corresponds to one of said normally loaded conditions; means for securing said control slide in said respective positions when said drive is subjected to loads in excess of said respective normally loaded conditions; and safety valve means including a valve member movable in response to excess loads relative to said control slide, after the latter has been secured in said respective positions by said securing means, between switching positions in which said adjusting means is operative to adjust the quantity of fluid transported by said transporting means.

4,032,261
BEARING STRAP AND COOLER

Bhim S. Madan, Brockport, N.Y., assignor to General Electric Company, Bridgeport, Conn.

Filed May 13, 1976, Ser. No. 685,731
Int. Cl.² F04B *17/00, 39/06;* **F16C** *37/00*
U.S. Cl. 417—366 **4 Claims**



1. In a motor driven household mixer having a housing around a rotary motor in a plastic frame and having front and rear bronze bearing assemblies, a fan adjacent the rear and a beater gear box adjacent the front assembly, an improved bearing strap and cooler for said front assembly comprising,

vents in the housing adjacent the gear box;

a generally H-shaped one-piece bearing strap;

means securing one leg of the H to the frame deforming said leg around the bearing;

the other leg being bent out of the plane of the H and opening towards the vents;

said other leg extending across the entire bearing width; whereby air moved by said fan is funneled by said bent leg towards the entire bearing cooling it and past the other leg cooling it.

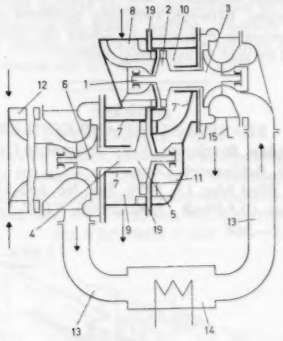
4,032,262
HOUSING ARRANGEMENT FOR A TWO-STAGE EXHAUST-GAS TURBOCHARGER

Gottlieb Zehnder, Kirchdorf, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Dec. 16, 1975, Ser. No. 641,305
Claims priority, application Switzerland, Dec. 18, 1974, 16879/74
Int. Cl.² F04B *17/00;* **F02B** *33/44;* **F01D** *25/24*
U.S. Cl. 417—409 **7 Claims**

1. A two-stage exhaust-gas turbocharger for internal combustion machines comprising at least two turbochargers, each said turbocharger comprising a shaft, and a compressor and an exhaust-gas turbine each mounted in axially spaced relationship on said shaft, a first one of said turbochargers operating as a high pressure stage and a second one of said turbochargers operating as a low pressure stage, means associated with

said two-stage exhaust-gas turbocharger for forming a path for compressed air with said compressors in said high pressure stage and said low pressure stage located in the path of said compressed air, said compressor in the low pressure stage of said turbocharger being located ahead of said compressor in the high pressure stage of said turbocharger in the flow path of the compressed air, said turbine in said low pressure stage of said turbocharger being located downstream of said turbine in said high pressure stage of said turbocharger relative to the flow of exhaust-gas through said two-stage exhaust-gas tubo-



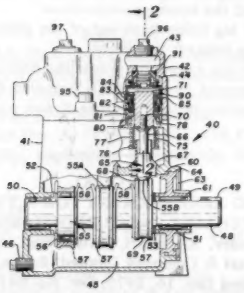
charger, said shafts in each of said turbochargers disposed in laterally spaced parallel relation, said high pressure stage of said turbocharger having an exhaust gas outlet and said low pressure stage of said turbocharger having an exhaust-gas inlet, and a common housing for said turbine in said high pressure stage of said turbocharger and for said turbine in said low pressure stage of said turbocharger with said common housing including the exhaust-gas outlet for said high pressure stage of said turbocharger and the exhaust-gas inlet for said low pressure stage of said turbocharger.

4,032,263

PUMP WITH COAXIAL INLET AND OUTLET VALVE ARRANGEMENT

Ramon Pareja, Minneapolis, Minn., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Sept. 25, 1975, Ser. No. 616,553
Int. Cl.² F04B *11/00*; F16K *17/26*
U.S. Cl. 417—539 **4 Claims**



1. Unitary inlet and outlet valve means for controlling flow of fluids to and from a pumping chamber having alternate suction and pressure cycles and comprising:

a. housing means including a generally cylindrical sleeve body member with an inlet at one end and a flow chamber at the opposed end thereof and having an annular flange extending outwardly from said sleeve body member and generally enclosing said flow chamber, a bore formed within said sleeve body member and extending axially therethrough and a counterbore formed within said sleeve body member and terminating along an annular shoulder; with said flow chamber being disposed within said annular flange, and with said annular flange having spaced apart radially inwardly extending portions at opposed axial ends of said flow chamber and including first and second annular base surfaces with said first annular base surface being at the end of said housing means adjacent said flow chamber and forming one end wall thereof;

b. a first annular groove formed around the periphery of said counterbore at a point axially spaced from said flow chamber toward said inlet and having a first generally resilient snap-ring means received therewithin with the inner edge of said snap-ring means extending inwardly from said counterbore to form a first annular base pad;

c. a poppet valve seated against said annular shoulder, a cup-shaped spider means having radially outwardly extending arms seated upon the upper end of said first snap-ring means, a first valve spring disposed within said counterbore with one end of said first valve spring being seated against said spider means and the opposed end against the inner surface of said poppet valve;

d. said annular flange having a plurality of bores formed through a second annular base surface opposed from said first annular base surface, with said bores being in communication with said flow chamber adjacent the lower end of said first snap-ring means, an annular valve ring disposed coaxially about the outer periphery of said sleeve body member and seated against the upper surface of said flange to seal said flange bores;

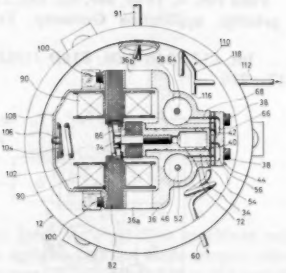
e. a second annular groove formed about the outer periphery of said sleeve body member, a second snap-ring means disposed within said second annular groove and having a portion extending radially outwardly of said sleeve body member to form a second annular base pad, and second valve spring means being disposed and compressed between said second annular base pad and said annular valve ring.

4,032,264

CLOSED-TYPE ELECTROMAGNETIC COMPRESSOR

Shiro Takahashi, Tokyo, Japan, assignor to Man Design Co., Ltd., Tokyo, Japan

Filed Dec. 10, 1975, Ser. No. 639,377
Int. Cl.² F04B *17/04*
U.S. Cl. 417—417 **7 Claims**



1. A closed-type electromagnetic compressor for use in a cooling system, said compressor comprising:

a substantially enclosed casing containing a first reservoir of lubricating oil;

a main body portion mounted in said casing, said main body portion including a cylindrical chamber adapted to receive a piston section of an armature assembly for reciprocating movement along a pumping axis;

a stator core assembly including a plurality of magnetic poles defining a magnetic field space there between, said magnetic field space being dimensioned so as to allow

free reciprocating movement of said armature assembly along said pumping axis when said stator core assembly is in operational engagement with said main body portion;

means for causing reciprocation of said armature assembly along said pumping axis including means for periodically energizing said stator core assembly so as to periodically generate a magnetic field within said magnetic field space;

means for lubricating said piston portion of said armature assembly as it reciprocates within said cylindrical chamber, said lubricating means including a first vertically aligned tube having an intermediate portion coupled to and communicating with a second return tube through which a refrigerant gas is circulated, said first tube having an upper opening positioned above the level of said oil in said oil reservoir and a lower opening positioned below the level of said oil in said first oil reservoir, a second oil reservoir formed in said main body portion at a position just below said upper end opening of said first tube and sufficiently close to a compressed refrigerant gas discharge chamber formed in said main body portion to heat said oil in said second oil reservoir and thereby cause refrigerant gases in said heated oil to be removed therefrom, said lubricating means further including means for guiding said heated oil from said hollow reservoir to said piston portion of said armature assembly;

means for joining a mating face of said stator core to a mating face of said main body portion;

a first plurality of fitting seats formed on said mating face of said stator core assembly symmetrically about said pumping axis, each of said first plurality of fitting seats being formed along an arc of a circle which is coaxial with said pumping axis;

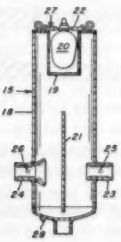
a second plurality of fitting seats formed on said mating face of said main body portion symmetrically about said pumping axis, each of said second plurality of fitting seats being formed along an arc of a second circle which is coaxial with said pumping axis, the shapes and positions of said fitting seats being chosen such that each of said first plurality of fitting seats precisely engages a differrent one of said second plurality of fitting seats whereby the central axis of said cylindrical chamber and said magnetic field space are both maintained in a position coaxial with said pumping axis.

4,032,265

SUCTION STABILIZER FOR RECIPROCATING PUMPS AND STABILIZING METHOD

John E. Miller, Dallas, Tex., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed July 19, 1974, Ser. No. 489,971
Int. Cl.² F04B *11/00;* **F16L** *55/04*
U.S. Cl. 417—540 **9 Claims**



1. The combination, with a reciprocating pump which has suction and discharge sides and a given displacement per revolution of its drive, and a source of liquid, of a suction stabilizer comprising:

a tank having an inlet connected to said source and an outlet connected to the suction side of said pump;

a flexible resilient bladder within said tank adapted to be inflated with gas;

a cage having perforate walls within said tank adjacent an end wall thereof and confining said bladder against wobbling; and

means for changing the direction of flow of liquid as the liquid passes through the tank and thus separating entrained gases from the liquid;

the ratio of the tank volume to the pump displacement per revolution being at least about ten to one;

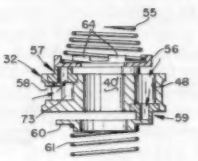
the ratio of the tank volume to the bladder volume when inflated being at least about four to one.

4,032,266

VALVE ASSEMBLY FOR RECIPROCATING DOWNHOLE PUMPS

George K. Roeder, P.O. Box 4335, Odessa, Tex. 79760

Filed Apr. 16, 1976, Ser. No. 677,537
Int. Cl.² F04B *39/10;* **F16K** *21/04*
U.S. Cl. 417—571 **8 Claims**



1. In a hydraulically actuated, downhole pump assembly having an engine which reciprocatingly drives a production pump piston within a pump barrel, with the pump piston being connected to the engine by a connecting rod, the combination with said pump piston and rod of a valve device which controls the flow of production fluid into and out of the pump barrel;

said valve device being a main body having the form of a circular hub, said main body having an upper and a lower face which are opposed respective to one another and spaced apart by a sidewall of said main body; a central, marginal, circumferentially extending portion of said sidewall being reduced in diameter to form an annulus about said main body; an axial bore for sealingly receiving the rod therethrough in a reciprocating manner, and a plurality of circumferentially spaced passageways extending through the main body such that the axial centerline thereof is parallel to and radially spaced from the axial centerline of said axial bore;

means forming a standoff exhaust valve seat on said lower face at the end of each said passageway; a closure means for each said seat, means by which said closure means is resiliently biased into abutting engagement concurrent with the free end of each said seat;

means forming a plurality of circumferentially spaced intake ports which include a counterbore which extends parallel to said radially spaced passageways and extend only partially through said main body and then radially outward into communication with said annulus, the axial centerline of said counterbore being aligned along a circumference which intersects the axial centerline of said passageways, with one said port being located between any two adjacent passageways;

the radially outwardly directed portion of said ports being a segment of a cylinder which has a diameter three times greater than the diameter of said counterbore, with the outer circumferential wall of said cylinder intersecting the axial centerline of said counterbore, and the height of said cylinder being one third the thickness of said circular hub; and with the axial centerline of said cylinder being

located along a line drawn from the axial centerline of said axial bore and said counterbore; and,

means forming a standoff intake valve seat on said upper face at the end of said counterbore; a closure means for each said valve seat, means by which said closure means is resiliently biased into abutting engagement concurrent with the free end of each of the last said seats.

4,032,267

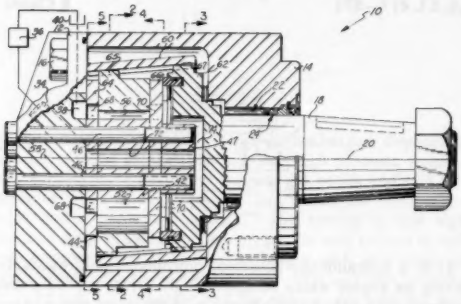
GEROTOR MOTOR WITH A STATIONARY INNER MEMBER AND A ROTATING AND ORBITING OUTER MEMBER

Laurence Lockhart Miller, West Lafayette, Ind., assignor to TRW Inc., Cleveland, Ohio

Filed Nov. 17, 1975, Ser. No. 632,520

Int. Cl.² F01C *1/02*, *17/02*; F03C *3/00*; F16D *3/18*

U.S. Cl. 418—61 B 10 Claims



1. A hydraulic motor comprising an elongated output member, bearing means supporting said output member for rotational movement about a central axis, a series of expansible and contractable fluid pockets formed by a gearset having an internally toothed outer member and an externally toothed inner member, said internally toothed outer member having a central axis and having orbital motion with respect to said output member central axis and rotational movement about its central axis and being guided in such movement by the meshing teeth of said inner and outer member, valve means for directing fluid into certain of said pockets to effect expansion thereof and for directing fluid out of contracting pockets to thereby effect rotational and orbital movement of said outer member, a tubular member drivingly coupling said output member to said outer member to effect rotation of said output member upon orbital and rotational movement of said outer member, said tubular member comprising an elongated body having an axial passageway therethrough, one end of said tubular member having a drive connection with said outer member at a plurality of locations circumferentially spaced around the central axis of the outer member, and the other end of said tubular member having a drive connection with said output member at a plurality of locations circumferentially spaced around said central axis of said output member, said drive connection between the outer member and said tubular member enabling orbital and rotational movement of said tubular member to occur with said outer member and rocking movement of said tubular member to occur relative to said outer member, and said drive connection between said output member and said tubular member effecting rotation of said output member upon orbiting and rotational movement of the end of said tubular member connected to said outer member and enabling rocking movement of the tubular member to occur relative to said output member.

4,032,268

ROTARY PISTON ENGINE

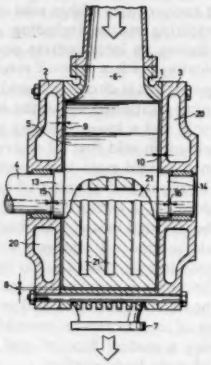
Felix Wankel, Lindau, Germany, assignor to Wankel GmbH, Berlin, Germany

Filed Mar. 5, 1975, Ser. No. 555,501

Claims priority, application Germany, Mar. 7, 1974, 2411004

Int. Cl.² F04C *27/00*

U.S. Cl. 418—91 10 Claims



1. In a rotary piston engine having a housing closed at its ends by first and second end plates, a rotor mounted on a shaft within said housing, said shaft being journalled in and extending through one of said end plates, said rotor being spaced from said housing and said end plates by means of radial and axial gaps, respectively, the improvement comprising:

means for decreasing said radial and axial gaps with increasing engine temperature and increasing said gaps with decreasing engine temperature to prevent seizing of said engine upon cooling.

4,032,269

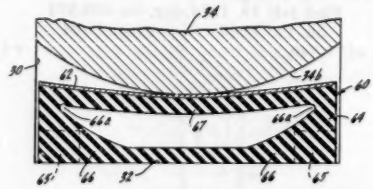
ROTARY VANE COMPRESSOR WITH VANE EXTENSION MEANS OF IMPROVED DESIGN

Rajesh N. Sheth, Mount Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed May 28, 1976, Ser. No. 691,060

Int. Cl.² F04C *29/00*; F16F *3/08*

U.S. Cl. 418—266 3 Claims

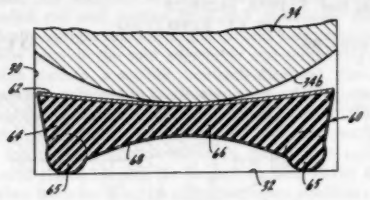


1. In a rotary compressor including a cylindrical rotor having a plurality of extensible vanes received in complementary vane slots, the improvement comprising: means defining a convex edge on the radially inner portion of said vanes, and a resilient element engageable with said convex edge, said resilient element having an intermediate section normally spaced from the bottom of said vane slots and adapted to flex downwardly upon engagment by said vane, said intermediate section supported by pier sections joined through means defining a concave edge adapted to receive said intermediate section when downwardly flexed.

4,032,270
ROTARY VANE COMPRESSOR WITH IMPROVED VANE EXTENSION MEANS

Rajesh N. Sheth, Mount Prospect, and Raymond L. Guzy, Morton Grove, both of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed May 28, 1976, Ser. No. 691,061
Int. Cl.² F04C 29/00; F16F 3/08
U.S. Cl. 418—266 4 Claims

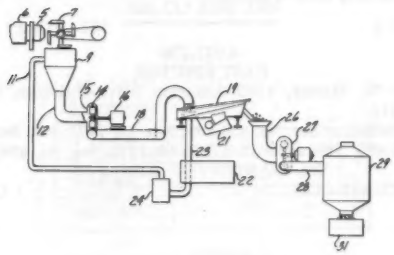


1. In a rotary compressor of the type including a cylindrical rotor having a plurality of extensible vanes received in complementary vane slots and a resilient element engageable with the radially inner portion of said vanes and adapted to flex downwardly upon engagement by said vane, said resilient element being a composite structure comprising a metal spring member engageable by the radially inner portion of said vanes, an elastomeric element bonded thereto and a wear surface on said elastomeric element formed of a stretch fabric.

4,032,271
HOT PELLET TRANSFER APPARATUS

Joseph Gasior, Bloomfield, N.J., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 3, 1975, Ser. No. 628,067
Int. Cl.² B22D 23/08
U.S. Cl. 425—10 6 Claims



1. Apparatus for processing hot thermoplastic pelletized material comprising:

pelletizing means for producing a stream of separated hot mutually-adhereable pellets of said material, and directing said stream in a downward path;

funnel means defining an interior upwardly diametrically expanding funnel surface terminating in a top opening of a size adapted to receive said stream of said pellets;

first liquid-conducting means for directing liquid in a stream aligned tangentially with an upper part of said funnel surface;

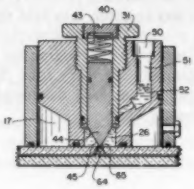
supply means associated with said liquid-conducting means for effecting a rate of discharge and direction of liquid from said liquid-conducting means which maintains a spirally descending fully-contiguous sheet of liquid substantially covering said surface;

said funnel surface terminating in a bottom opening of sufficient size and said apparatus comprising means for withdrawing the resulting slurry comprising said sheet of liquid and any pellets suspended therein to effect such prompt drainage of the slurry from the funnel means as to maintain said sheet of liquid along said surface without substantial pile up of liquid at the bottom of the surface.

4,032,272
WINDSHIELD REPAIR DEVICE

Richard E. W. Miller, 3216 NE. 13 St., Apt. 7, Pompano Beach, Fla. 33062

Filed June 16, 1976, Ser. No. 696,719
Int. Cl.² B32B 35/00; B29F 5/00
U.S. Cl. 425—12 11 Claims

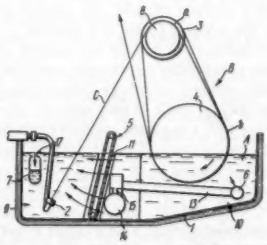


1. A device for repairing a pockmark in a pane of safety glass with a transparent, low-viscosity, highly-penetrating, liquid sealant comprising means for sealing off a first given area of said safety glass around said pockmark; means for evacuating the sealed portion of said first given area; means for sealing off a second given area of said safety glass, around said pockmark, within first given area; means for applying said liquid sealant to the sealed portion of said second given area, to fill the voids in said pockmark; means for filling said sealed portion of said first given area with air to release said device from the surface of said safety glass; means for transforming said liquid sealant to a transparent solid material; and means for leveling and polishing said transparent solid material around said pockmark to render said pockmark invisible.

4,032,273
APPARATUS FOR SPINNING ARTIFICIAL FILAMENT

Ivan Viktorovich Gritskov, ulitsa Sverdlova, 10, kv. 2; Pavel Anatolievich Butyagin, ulitsa Sovetskaya, 39/1, kv. 6, both of Cherkassy; Ivan Gavrilovich Shimko, ulitsa Rudnevoi, 4/13, kv. 24, Moscow; Evsei Moiseevich Mogilevsky, Kutuzovsky prospekt, 17, kv. 9, Moscow; Igor Petrovich Baksheev, proezd Shokalskogo, 153, kv. 140, Moscow; Georgy Georgievich Finger, ulitsa Matveevskaya, 4, korpus 2, kv. 21, Moscow; Ljudmila Sergeevna Scherbakova, prospekt Kosmonavtov, 27, korpus 2, kv. 104, Leningrad; Nina Timofeevna Butkova, ulitsa Sovetskaya, 39/1, kv. 6, Cherkassy, and Lev Grigorievich Kaller, ulitsa Krasilovskaya, 5/2, kv. 10, Kiev, all of U.S.S.R.

Filed Jan. 22, 1976, Ser. No. 651,246
Int. Cl.² D01D 3/00, 5/06
U.S. Cl. 425—67 5 Claims



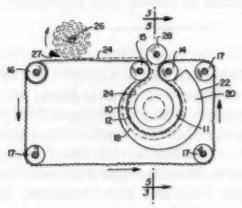
1. An apparatus for spinning artificial filaments comprising: a reservoir for spinning solution; a spinneret; filament-for-

warding means for forwarding a filament, said filament-forwarding means being arranged with respect to said reservoir for forwarding a filament along a path part of which is submerged in the spinning solution; a partition mounted in said reservoir between the spinneret and said part of said path, said partition being permeable for the spinning solution and dividing the reservoir into a spinning zone and a complete recovery zone, said partition filtering the spinning solution during passing thereof from the complete recovery zone to the spinning zone, the spinneret being mounted in the spinning zone, whereas said part of said path is located in the complete recovery zone, whereby the filaments forwarded by said forwarding means are subjected to complete recovery; a supply collector for feeding the spinning solution into said reservoir, said supply collector being mounted in the complete recovery zone; and a discharge collector for discharging the spinning solution passing from the complete recovery zone through said partition into the spinning zone, said discharge collector being arranged in the spinning zone.

4,032,274
LINEAR APPARATUS FOR HIGH SPEED PRODUCTION OF AIR-LAID NON-WOVEN WEBS

Marion Frank Troy, Hinsdale, and Ewald Albert Kamp, Chicago, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 436,615, Jan. 25, 1974, Pat. No. 3,966,858. This application Mar. 10, 1976, Ser. No. 665,529
Int. Cl.² B28B *5/02*; B29C *13/00*; B29D *7/00*
U.S. Cl. 425—83 **13 Claims**

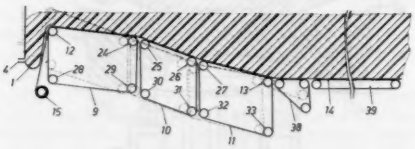


1. Apparatus for producing a non-woven fibrous web comprising: a flexible, endless foraminous belt; drive means for causing continuous longitudinal movement of said belt; guide means engaging said belt to cause it to form a closed substantially enveloping loop while maintaining a uniform profile across the belt width; supply means for providing a stream of fibers suspended in a fluid; spinner means connected to said supply means and positioned inside the arc formed by the looped belt for directing a fiber-containing fluid stream toward the interior surface of said arc section of said belt uniformly across the width of said belt around a substantial portion of the circumference of said arc section of said belt; said spinner means comprising a rotatable member having the plurality of arcuate channel openings spaced along its length and around its periphery, each of said arcuate channel openings communicating with a separate conduit extending parallel to the axis of the central shaft of said rotatable member from said arcuate channel opening to an end of said rotatable member where said conduit receives a portion of the fiber-containing stream from said supply means; and exhaust means mounted in coaxial relationship with at least a portion of the outer circumference of the arc section of said belt to apply suction through said belt for the purpose of promoting rapid deposit of fibers on said interior surface of said arc of said belt while removing said fluid through said belt.

4,032,275
DEVICE FOR THE CONTINUOUS PRODUCTION OF A STRAND OF FOAMED MATERIAL

Johann Schwab, Vienna; Maternus Gluck, Linz-Hart; Egon Kratochvil, Maria Enzersdorf, and Peter Kitzmantel, Vienna, all of Austria, assignors to Semperit Aktiengesellschaft, Vienna, Austria

Filed Dec. 4, 1975, Ser. No. 637,658
Claims priority, application Switzerland, Dec. 9, 1974, 16308/74; Nov. 5, 1975, 14258/75
Int. Cl.² B29D *27/00*
U.S. Cl. 425—89 **13 Claims**

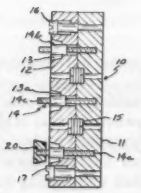


1. In a device for the continuous production of a strand of foamed material including an overflow vessel for the foamable mixture, said overflow vessel having end walls defining the width thereof, a downwardly inclined foaming track at the outlet of the overflow vessel, a horizontal curing track positioned downstream and spaced from the overflow vessel and foaming track and lateral conveyors arranged adjacent each lateral side of the foaming track, the improvement comprising said overflow vessel including means operatively associated with said overflow vessel for adjusting the width thereof, an elastic membrane connected adjacent the end walls of the overflow vessel, said membrane being extensible between said end walls as the width of said overflow vessel is adjusted, means operatively associated with said foaming track for adjusting the width of said foaming track and a flexible web connected adjacent the lateral sides of the foaming track, said web being extensible between said lateral sides as the width of said foaming track is adjusted.

4,032,276
CAST EJECTOR

Roger W. Mercer, 1340 Arlington Drive, Fairborn, Ohio 45324

Division of Ser. No. 550,109, Feb. 13, 1975, Pat. No. 3,975,489. This application Feb. 10, 1976, Ser. No. 656,916
Int. Cl.² B29D *1/00*; B29C *1/16*
U.S. Cl. 425—123 **1 Claim**



1. Apparatus for casting one or more articles, such as a plastic, threaded dental cast ejector button, each with an internally threaded opening and comprising; a mold device having a flat plate member means including a movably-mounted, top plate member incorporating one or more mold cavities for receiving therein the material to be cast in a plastic flow form; a fixedly-mounted, base plate member mounting an externally-threaded, rigid support and mold-modifying rod element for each of said mold cavities and disposed in adjustable and removably-mounted relation on said base plate mem-

ber below said top plate member and each having a vertically-oriented top rod end portion extending into and projecting upwardly through a centrally disposed opening in the bottom of each of said mold cavities formed in said top plate member; first, resilient interconnecting means disposed between said fixed base plate member and said movable top plate member, and normally holding said top plate member in an upper, spaced-apart relation and open position relative to said base plate member; second, rigid interconnecting means constituting said rod members and each incorporating a first, lower, threaded rod end portion fixed and threadedly enlarged in vertically-upright relation to and on said base plate member to thereby provide the said adjustable and removably-mounted relation thereto, a second, centrally-disposed, non-threaded rod portion enlarged to be slidably engaged in relatively snug-fit relation in the said bottom opening in each of said mold cavities, and a third, upper, threaded, rod end constituting the said top rod end portion normally disposed in substantially centered relation within the respective mold cavity when said top plate member is in the said upper open position relative to said base plate member to thereby form the said internally threaded opening in each of said casted articles; and manually-controlled means comprising a hand-operated clamping device for repositioning said top plate member downwardly into a closed position against said base plate member to thereby automatically remove each of said casted articles from the respective mold cavity and simultaneously completely expose it to view above the mold cavity for its subsequent manual removal by the unscrewing thereof from the respective third, upper, threaded, rod end portion.

4,032,277

INJECTION MOLDING MACHINE WITH HYDRAULICALLY OPERATED CLOSURE DEVICE

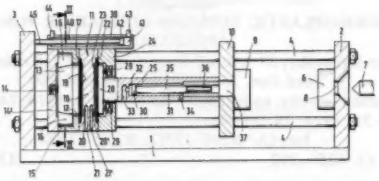
Joachim Linde, Leiselheim, and Wolfgang Späth, Lahr, both of Germany, assignors to Klockner-Werke AG, Duisburg, Germany

Filed Nov. 5, 1975, Ser. No. 629,080

Claims priority, application Germany, Nov. 13, 1974, 2453697

Int. Cl.² B29F *1/06*

U.S. Cl. 425—591 **8 Claims**



1. In an injection molding machine, a combination comprising a stationary frame including a support plate, a stationary platen spaced from said support plate, and a plurality of axially parallel rods interconnecting said support plate and stationary platen; a movable platen mounted on said rods for axial movement; means for interchangeably mounting parts of a split injection mold having a given axial dimension on said platens for opening and closing said mold; guide means including a guide housing mounted on said rods intermediate said support plate and movable platen for joint movement with the latter, and a membrane plate rigidly connected to said guide housing and having one side facing said support plate and another side facing said movable platen; means for jointly moving said guide means and movable platen to and from a position in which said mold having said dimension is closed; means for arresting said movable platen in said position, including a plurality of clamping jaws mounted on said guide housing for displacement into and out of clamping contact with said rods, a clamping cone mounted on said guide housing at said one side of said membrane for axial displacement and engaging said jaws, a membrane interposed between said one side and said cone and sealingly connected to said membrane plate to define a pressure space therewith, and means for admitting pressurized medium into said space to act on said membrane and deflect the same against said cone to thereby displace the latter and thus said jaws engaged thereby into said clamping contact; means for injecting moldable material under pressure into said closed mold so that said mold parts are urged apart and a separating force acts on said movable platen; and means for counteracting said separating force independently of said arresting means, including a pressure plate rigid with said movable platen and arranged at said other side of said membrane plate, an additional membrane interposed between said other side and said pressure plate and sealingly connected to said membrane plate to define an additional pressure space therewith, and means for admitting pressurized medium into said additional space to exert a force on said additonal membrane and via the same on said pressure plate, which force at least equals said separating force, whereby said arresting means arrests said mold in the closed position thereof and said counteracting means independently maintains said mold in said closed position.

4,032,278

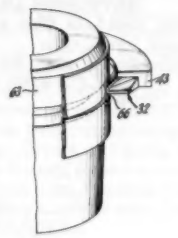
SEALING AND SHEARING MEMBER IN A PLASTIC RESIN BLOW MOLDING MACHINE

Ernest O. Kuenzig, Glen Head, and Frank L. Pennino, Farmingdale, both of N.Y., assignors to Forest Mechanical Products Corporation, Kew Gardens, N.Y.

Filed Mar. 2, 1976, Ser. No. 663,124

Int. Cl.² B29C *17/07*

U.S. Cl. 425—525 **6 Claims**



1. In a blow molding machine in which a plastic resin parison is extruded in tubular form along an axis from an extruder around a vertically aligned blow tube and in which said blow tube delivers compressed air to expand the parison to form against the internal walls of a two-part separable mold when the separable mold is in its closed position, said mold being positioned beneath said extruder along the axis of the blow tube and having open and closed positions, the mold having a separable two-part top neck portion, said blow tube carrying a cylindrical blow pin having a cylindrical shoulder portion and a cylindrical shear portion, said blow pin being movable vertically upwards to aid in severing the parison after the mold parts are closed;

a plastic resin severing and closure device removably affixed at said top neck portion of each of said two mold parts and separable along with said mold parts, said device in cooperation with the blow pin severing the parison and providing an air-tight seal between the mold and the parison when the separable mold is in its closed position;

said severing and closure device comprising two base members, each base member being fixed to a top neck portion of one mold part and being operable to hold a top seal insert and a bottom shear insert fixedly in respect to the mold part, each base member being in the approximate form of a one-half ring and having a flat surface generally

perpendicular to said axis and having a flange portion extending generally perpendicularly from said flat portion, said flange portion being operable to align said top seal insert and said shear insert with respect to said axis, said base members being of a heat conductive metal alloy;

two top seal inserts each removably fixed to a base member and each in the form of a generally flat member and being approximately a one-half ring, each of said seal inserts being mounted such that an inner edge is close to but not touching said shoulder of said blow pin when the mold parts are closed in order to compress but not shear said parison and thereby to seal and permit blow pressure within said parison, said seal inserts being of heat hardened steel;

means removably affixing each of said seal inserts on one of said base members so that they are separable along with said mold parts;

two bottom shear inserts separable along with said mold parts, each bottom shear insert being in the form of a generally flat member and being approximately a one-half ring member, each of said shear inserts having an inner face which meets in a shearing action against said shear portion of said blow pin to shear the parison when the blow pin is moved vertically upwards, each of said shear inserts having an inner edge with an inner diameter which is less than the inner diameter of said inner edge of said seal inserts; each of said shear inserts being of heat-hardened steel; and

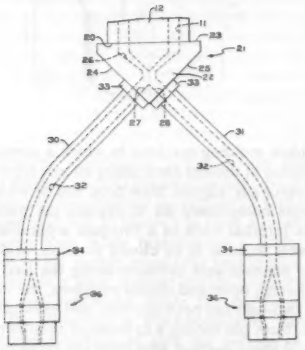
means removably affixing each of said shear inserts on one of said seal inserts and touching the flange portion of one of said base members.

4,032,279

EXTRUSION ADAPTER

Heung Tai Kim, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Sept. 8, 1975, Ser. No. 611,396
Int. Cl.² B29D *23/04*
U.S. Cl. 425—382 R **6 Claims**



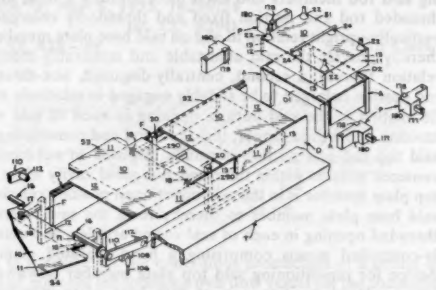
1. In combination with an extruder, an adapter apparatus for splitting an extrudate from said extruder as a single extrudate into at least a pair of separate extrudates comprising non-sectioned single piece adapter block attached to said extruder having a first planar surface, said first planar surface having an inlet opening for abutting connection to extruder for said opening receiving melt therefrom, said block having at least two non-coplanar surfaces, an outlet opening in each of said non-coplanar surfaces with said outlet opening used for directing extrudate therefrom, a single passageway extending from said inlet opening into said block, at least a pair of passageways interconnecting said outlet openings with said single passageway, and all of said openings being circles.

4,032,280

FABRICATION OF BOX PARTS FROM PLASTIC MATERIAL

Frederick D. Roberts, Chalfont, Pa., assignor to FMC Corporation, San Jose, Calif.

Division of Ser. No. 570,903, April 23, 1975, Pat. No. 3,977,307. This application Apr. 19, 1976, Ser. No. 678,332
Int. Cl.² B31B *1/26*
U.S. Cl. 425—383 **11 Claims**



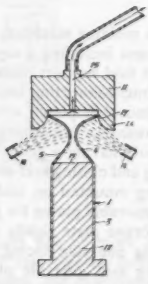
1. Apparatus for forming plastic box parts form corner notched blanks which have main panels, side panels and end panels having tabs; said apparatus comprising laterally spaced longitudinal die sets for folding the end panels, longitudinally spaced transverse die sets in longitudinal alignment with said longitudinal die sets for folding the side panels, anvils at the ends of said transverse die sets, tab folders having end panel clamps for cooperation with said anvils, said tab folders having combined solvent applicator and tab folder bars for folding said tabs, means for supplying solvent to said applicator bars, and means for feeding blanks along said die sets; the improvement wherein the tab engaging faces of said solvent applicator bars are formed with a plurality of vertical grooves, said solvent supplying means having means for directing solvent to the upper ends of said grooves, for flowing solvent down along said grooves.

4,032,281

THERMOPLASTIC TUBULAR CONTAINER FORMING APPARATUS

Oscar Rakovsky, 37 Avenue Duquesne, Paris 7, France

Filed Dec. 26, 1974, Ser. No. 536,469
Claims priority, application France, Feb. 4, 1974, 74.04746; May 31, 1974, 74.19869
Int. Cl.² B29C *17/02*; B29D *23/00*
U.S. Cl. 425—392 **13 Claims**



1. Apparatus for the manufacture of a tubular product of thermoplastics material, said product comprising an end face and a tubular skirt extending therefrom, the apparatus comprising:

a mandrel, having a free end, for receiving a length of tubu-

lar thermoplastic material sleeved thereon with an end portion adjacent one end of said length of material projecting beyond said free end of said mandrel such that, in the operating position of said mandrel, at least a major part of the said projecting end portion of said length is otherwise unsupported and is disposed in and surrounded by a free space;

heating means located in operative relationship to said mandrel for supplying heat into said free space to heat said otherwise unsupported end portion of said length;

constrictor means, located in operative relationship to said mandrel, for uring the heated and otherwise unsupported end portion inwardly to effect constriction thereof while preserving said free space;

a cap initially disposed adjacent to and spaced from said end portion of said tubular material;

and means, operative after said constriction of said heated end portion, for relatively moving said cap and said mandrel from a first, inoperative position in which said cap is spaced from said free end of said mandrel to a second, operative position adjacent to said free end wherein said cap is urged into engagement with said heated end portion to cause moulding of the material thereof between said cap and said free end to form the end face of the tubular product.

4,032,282

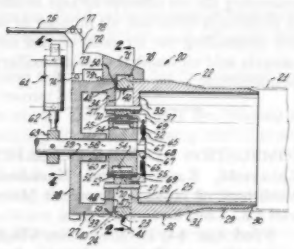
APPARATUS FOR FORMING BELLS ON PLASTIC TUBES

Clyde E. Wilson, and Robert D. Nicoson, both of Brazil, Ind., assignors to Wilson-Tek Corporation, Brazil, Ind.

Continuation-in-part of Ser. Nos. 400,165, Sept. 24, 1973, abandoned, and Ser. No. 512,230, Oct. 14, 1974, abandoned. This application Aug. 5, 1975, Ser. No. 602,128

Int. Cl.² B28B 7/30

U.S. Cl. 425—393 **22 Claims**



1. Apparatus for forming bells on plastic tubes of a first preselected inside diameter by enlarging the ends of the tubes to a larger preselected diameter, and also forming an internal annular seal-receiving groove in each such bell, said apparatus comprising:

an elongated mandrel of circular cross-section comprising front and rear mandrel elements disposed in coaxial relation with the adjacent ends of said elements spaced apart to provide a continuous gap between the elements;

said front mandrel element having a free end portion with an outer surface of said first preselected diameter and also having a beveled free end, the opposite end portion of said front element having an outside surface of said larger preselected diameter and joined to said free end portion by an intermediate portion of progressively increasing outside diameter, and said rear element having an outer surface of said larger preselected diameter;

internal annular flanges on said mandrel elements on opposite sides of said gap;

angularly spaced supporting pins extending longitudinally of said mandrel across said gap and each fixed at its opposite ends to the respective internal flanges on said elements, thereby to support said front element on said rear element;

core means disposed in said gap and comprising first and second sets of core sections each having a contoured outside surface of arcuate cross-section, the core sections of said first set alternating with the core sections of said second set around said mandrel and having inwardly converging sides, and the core sections of said second set having inwardly diverging sides disposed in sliding camming engagement with said converging sides, and also having generally arcuate and convex inner end surfaces disposed radially inwardly beyond the sections of said first set, said inner end surfaces having central dwell recesses in the central portions thereon;

said core sections being movable outwardly in said gap to an expanded condition in which said outside surfaces extend beyond the mandrel surfaces of said larger diameter and form a raised annular bead of preselected contour for forming said seal-receiving groove in a plastic tube, and being movable inwardly to a collapsed condition in which said core sections are retracted into said mandrel;

each of said core sections having at least one generally radial guide slot therein, said supporting pins extending through said slots with close sliding fits to guide said core sections for in and out radial movement;

opposed annular abutment means on one of said flanges and on the adjacent side of said core means limiting outward movement of said core sections and determining said expanded condition;

and actuating means for expanding and retracting said core means, said actuating means comprising a rotary drive shaft coaxial with said mandrel and extending into said rear section from the rear end thereof, a spider in said gap coaxially mounted on said shaft for rotation therewith and having angularly spaced arms equal in number to the number of second core sections, adjacent arms of said spider being separated by arcuate recesses for receiving said inner end surfaces when said core sections are retracted, rollers mounted on the ends of said arms, means for selectively rotating said shaft back and forth through a selected angular increment to move said rollers along said inner end surfaces from corresponding ends thereof to the dwell portions and back, and spring means yieldably urging said core sections toward the retracted position, said dwell portions being shaped to prevent forcing of said rollers back along said inner end surfaces by external forces on said core sections.

4,032,283

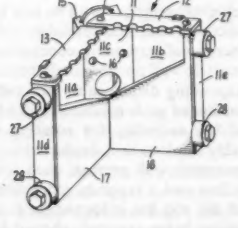
EXTERIOR CORNER TOOL

Eugene R. Johnson, Burlingame, and Morris F. Mower, Santa Clara, both of Calif., assignors to Bliss & Laughlin Ind., Inc., Oak Brook, Ill.

Filed Mar. 8, 1976, Ser. No. 664,583

Int. Cl.² B05C 17/10

U.S. Cl. 425—458 **6 Claims**



1. A corner tool for applying mastic material to an external

corner formed by two surfaces which come together at approximately 90°, said tool comprising:

container means defining a cavity that is open in two convergent and substantially perpendicular planes and having surfaces in each of said planes that converge peripherally of said cavity and come together at an internal corner, said container means including a pair of slotted screed plates that extend substantially perpendicular to each other and transverse relative to said corner; and means for positioning said container means relative to an external corner of approximately 90° to maintain said slotted plates in contact with two surfaces forming the external corner while positioning the cavity of said tool in open-spaced relationship to the surface; whereby mastic material introduced into said cavity may be applied simultaneously to the surfaces on either side of the external corner through said slotted screed plates.

4,032,284

DIE ASSEMBLY

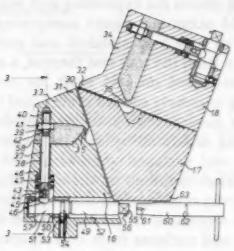
René Leonard Vermeylen, Heist op den Berg, and Jozef Jan Onghena, Heverlee, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed May 29, 1975, Ser. No. 581,916

Claims priority, application United Kingdom, June 6, 1974, 25216/74

Int. Cl.² B29F *3/04*

U.S. Cl. 425—466 **6 Claims**



1. In an extrusion die assembly comprising two bodies defining a slot terminating in an elongated slot-like orifice and defined by two lips carried by said bodies, adjustment means operatively associated with one of said bodies for adjusting the position of said one body relative to the other for varying the width of such slot, the improvement wherein said adjustment means comprises a plurality of rods each having one extremity in threadwise engagement with said one body and disposed in mutually spaced relation in a row extending substantially parallel with the length of said orifices, each of said rods being axially displaceable for exerting on said one body a force tending to move such body relative to the other body to vary the orifice width, each of said rods being mounted for rotation and including exteriorly accessible means for rotating the same to adjust the initial axial position of said rod and thus the initial width of said slot, and, for each such axially displaceable rod, a rotatable rod arranged with its axis intersecting the axis of said displaceable rod, said rotatable rod having a portion of its peripheral wall extending eccentrically of the rod axis with said eccentric wall portion in abutment with the free end of the corresponding displaceable rod and means on an axially spaced portion of each rotatable rod which is accessible exteriorly of the assembly for rotating the same and thereby controllably displace said displaceable rod by engagement with said eccentric wall portion, each said displaceable rod having at its free end a separate extension connected to the remainder of the rod for independent rotation, the end face of said extension being arcuately shaped for engagement over substantially the entirely of said face with said eccentric wall portion.

4,032,285

METHOD AND APPARATUS FOR THE AUTOMATIC CONTROL OF THE AIR RATIO OF A COMBUSTION PROCESS

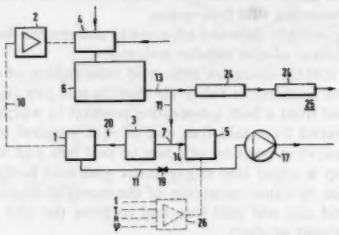
Franz Josef Rohr, Absteinach, and Hubert Holick, Lampertheim, both of Germany, assignors to Brown, Boveri & Cie. A.G., Mannheim, Germany

Filed Dec. 19, 1975, Ser. No. 642,449

Claims priority, application Germany, Dec. 19, 1974, 2460066

Int. Cl.² F23N *5/10*

U.S. Cl. 431—12 **28 Claims**



1. A method for automatically controlling the air ratio of a combustion process by adjustment of the fuel-air mixture as a function of the air number λ, the air number λ of the exhaust gas being measured with a sensor which is particularly sensitive at an air number of a given magnitude, and the combustion process operating with an air ratio having an air number of a different magnitude of the sensitivity range of said sensor which comprises extracting a hot exhaust gas stream from the combustion process having an air ratio with an air number out of the given sensitivity range of a sensor changing the amount of air in said exhaust gas stream to provide an auxiliary gas stream having an air number in said sensitivity range of said sensor, measuring the air number of said auxiliary gas stream detect the difference from said air number of said given magnitude, and controlling the air ratio of said combustion process to maintain said air number of said auxiliary gas stream at said given magnitude.

4,032,286

GAS COMBUSTION DEVICE WITH SAFETY DEVICE

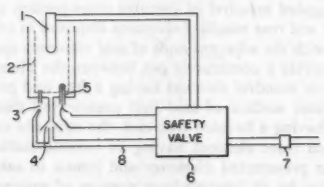
Teruo Kobayashi, Kadoma, and Kazumasa Yamamoto, Kawanishi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 14, 1976, Ser. No. 676,816

Claims priority, application Japan, Apr. 18, 1975, 50-47763; May 20, 1975, 50-60739; Oct. 20, 1975, 50-126690

Int. Cl.² F23N *5/24*

U.S. Cl. 431—76 **6 Claims**



1. A gas combustion device with a safety device characterized by the provision of

a. a combustible gas sensor comprising a calcined body made of a solid ion conductive, electrolyte material, and porous electrodes attached to both surfaces of said calcined body,

b. a pilot burner sensor including a thermocouple which creates an electromotive force (e.m.f.) in response to the detection of heat of combustion flames of said gas combustion device, and

c. a safety valve connected in a gas supply line for said gas combustion device and operable in response to both the outputs from said combustible gas sensor and said pilot burner sensor.

4,032,287

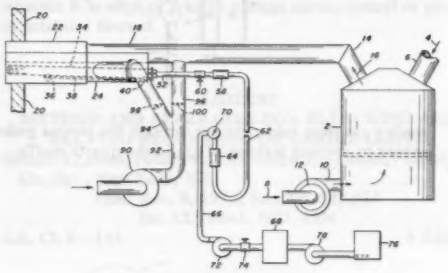
COMBINATION BURNER

Kenneth J. Blum, Hudson, N.Y.; Floyd Dodson, Ross Township, Allegheny County, Pa.; Robert P. Jarrett, Livingston Township, Columbia County, and Norman T. Ravnsborg, Claverack, both of N.Y., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed June 16, 1975, Ser. No. 587,442

Int. Cl.² F23C *5/28, 1/10, 1/12*

U.S. Cl. 431—175 **6 Claims**



1. A burner for burning solid pulverized and fluid fuels singly or in combination comprising:

a burner pipe adapted for burning a pulverized fuel carried in suspension in its primary air,

a burner chamber fixed with respect to the burner pipe mounted generally parallel to and adjacent the burner pipe,

a burner housing tube mounted for longitudinal movement within the burner chamber,

a fluid burner nozzle mounted inside the housing tube,

means for clamping the burner housing tube in position with respect to the burner chamber,

a source of fluid fuel,

means connecting the source of fluid fuel to the nozzle,

a source of primary air for the fluid fuel,

an outlet conduit from the source of primary air for the fluid fuel,

a first branch conduit connecting the outlet conduit to the burner pipe,

a second branch conduit connecting the outlet conduit to the burner chamber, and

control means in each branch conduit for controlling the flow of air from the source of air for the fluid fuel through each branch conduit.

4,032,288

ROOFING SHINGLE MINERAL FILLER HEATER

Kenneth J. Numerowski, Chicago, Ill., assignor to U.I.P. Engineered Products Corporation, Elk Grove Village, Ill.

Filed Oct. 16, 1975, Ser. No. 622,850

Int. Cl.² F27D *1/08, 17/00*

U.S. Cl. 432—189 **7 Claims**

1. An assembly for heating mineral filler prior to combining the filler with a heated liquid asphalt for coating roofing shingles, said assembly comprising:

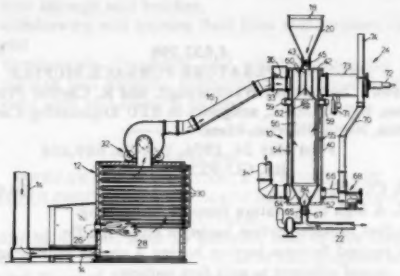
a mineral filler heater,

a thermal oxidizing means for heating fume emissions to remove hydrocarbons,

means connecting said oxidizing means to said heater for directing the high temperature fume emissions from the thermal oxidizing means to said filler heater,

a first burner in said directing means for maintaining the fume emissions at a predetermined temperature,

a regenerating system connected to said filler heater for reheating discharge gases and redirecting the higher temperature discharge gases into the inlet to the filler heater,



a second burner in said regenerating system to maintain said recycled gas at a predetermined minimum,

means continuously moving mineral filler through said filler heater,

and means for selectively connecting one of said thermal oxidizing means and regenerating system to said filler heater.

4,032,289

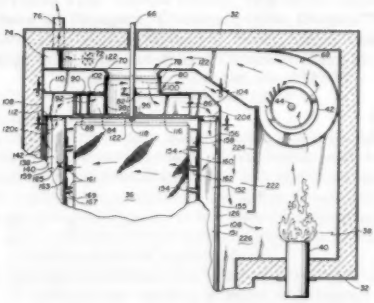
CONVECTION OVEN

David E. Johnson, Minneapolis, and Terrance E. Polsfuss, Clear Lake, both of Minn., assignors to Despatch Industries, Inc., Minneapolis, Minn.

Filed Sept. 8, 1975, Ser. No. 610,981

Int. Cl.² F27B *5/16*

U.S. Cl. 432—200 **17 Claims**



16. A convection oven comprising a stationary oven chamber for receiving goods to be treated, conduit means including at least two pairs of separate duct means having respective openings into the oven chamber distributed about the chamber periphery with the openings of each pair disposed at opposite sides of the chamber; and rotatable rotor means sequentially delivering gaseous treating medium to the duct means for delivery of the medium into the oven chamber from sequential duct openings, and providing simultaneous with-

drawal of the heating medium from ducts opposed from the delivery ducts.

4,032,290

HIGH TEMPERATURE FURNACE MUFFLE

Martin I. Soderlund, Westborough, and R. Chester Pray, Acton, both of Mass., assignors to BTU Engineering Corporation, North Billerica, Mass.

Filed May 24, 1976, Ser. No. 689,554
Int. Cl.[2] F27B 5/18, 5/02
U.S. Cl. 432—200 10 Claims

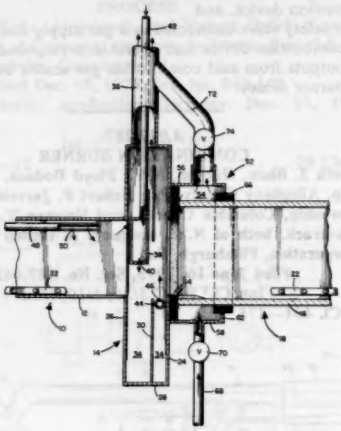
1. A high temperature furnace comprising:

a first furnace section having a metal muffle;

a second furnace section having a quartz muffle and disposed adjacent to said first section;

sealing means surrounding an end of said quartz muffle confronting said metal muffle and including a peripheral chamber joined to the quartz muffle and to a confronting surface of said metal muffle by porous gasket means; and

means coupled to said peripheral chamber and operative to introduce sealing gas at predetermined pressure into the peripheral chamber to cause controlled leakage of the



sealing gas from said chamber through the porous gasket means to prevent leakage of gas in the quartz muffle.

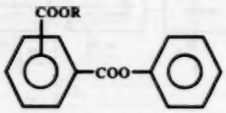
4,032,291

PHENYL PHTHALATE CARRIERS IN DYEING AND PRINTING SYNTHETIC FIBERS

Kurt Adolf Dellian, Greensboro, N.C., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,333
Int. Cl.² D06P 5/04; C09B 9/00
U.S. Cl. 8—34 18 Claims

1. In a process for coloring a hydrophobic fibrous material with a disperse or vat dyestuff with the aid of a carrier, the improvement wherein the carrier comprises a compound of the formula



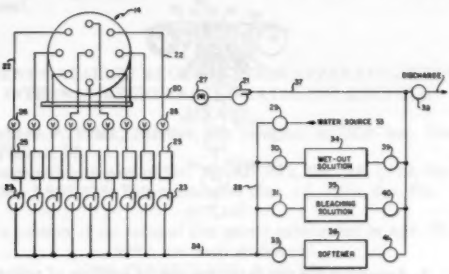
wherein R is alkyl of 1 to 12 carbon atoms, benzyl or phenyl or mixtures thereof.

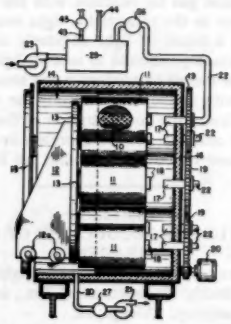
4,032,292

METHOD AND APPARATUS FOR BLEACHING AND RELATED PROCESSING OF GREIGE CLOTH

Donald K. Jones, Pottstown, Pa., assignor to Cluett, Peabody & Co., Inc., New York, N.Y.

Filed Nov. 8, 1974, Ser. No. 522,014
Int. Cl.² D06L 3/02, 3/04
U.S. Cl. 8—111 6 Claims





1. A method for bleaching fabric in batches, comprising the steps of

a. forming the fabric into batches;
b. placing the batches in a pressure vessel;
c. supplying pressurized treating fluid directly to said batches; the improvements characterized by the steps of
d. dividing said treating fluid supply into individual portions for each said batch;
e. pressurizing each individual portion for each individual batch;
f. after said pressurizing step, heating each said pressurized portion;
g. after said heating step, passing each heated pressurized portion individually into said pressure vessel and through one of said individual batches;
h. adjusting separately the individual pressurization of each individual pressurized portion to provide uniformity of flow through said batches;
i. withdrawing said treating fluid from said pressure vessel; and
j. continuously circulating said withdrawn treating fluid through said dividing, pressurizing, heating and passing steps until said fabric is treated.

4,032,293

PREPARATION OF STABLE STRONG BASE CELLULOSIC ANION EXCHANGERS WITH RED-OX POTENTIALS

Dorothy M. Perrier; Ruth R. Benerito, both of New Orleans, and Richard H. Steele, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sept. 9, 1974, Ser. No. 504,646
Int. Cl.² D06M 13/10, 13/46; G01N 31/04
U.S. Cl. 8—129 16 Claims

1. A process for preparing a textile with strong base quaternary ammonium cellulose groups associated with reducing anions, the process comprising:

a. immersing a diethylaminoethyl fibrous cellulose of about 2.6% nitrogen content in a 20% methanolic solution of methyl iodide,
b. refluxing the immersed fibrous material for about 5 hours to obtain a fibrous monoquaternary cellulosic derivative, the methyl iodide adduct of DEAE-cellulose,
c. rinsing the adduct in absolute methanol to remove all unreacted reagent, and
d. treating the product of (c) with a 20% dimethyl formamide solution of sodium borohydride for about 7 hours at room temperature to yield a textile containing about 2.6% nitrogen and 1.17% boron, which product being insoluble in dimethylformamide but dispersible in water.

4,032,294

METHOD FOR VAPOR PHASE TREATING GARMENTS

Richard D. Thompson, Cincinnati, Ohio; Douglas Thompson, Salt Lake City, and Micheal G. Beeley, Logan, both of Utah, assignors to McGraw-Edison Company, Elgin, Ill.

Filed Feb. 1, 1974, Ser. No. 438,587
Int. Cl.² D06M 13/14
U.S. Cl. 8—116.4 10 Claims

1. A process for vapor phase treating garments, each having cellulosic or natural protein fibers therein and being supported in a substantially wrinkle-free condition on a form, with moisture, formaldehyde, and sulfur dioxide, comprising:

a. grouping such garments into first and subsequent batches each consisting of a plurality of garments and each being of substantially the same size;
b. indexing the defined first batch of garments to a first area of isolation and holding it there to introduce moisture into such garments;
c. indexing the defined first batch of garments then to a second area of isolation and holding it there to subject such garments to formaldehyde and sulfur dioxide vapors;
d. indexing the defined first batch of garments next to a third area of isolation and holding it there to heat and dry such garments;
e. indexing the defined first batch of garments thereafter to a fourth area of isolation and holding it there to vapor clean the garments and remove formaldehyde odor therefrom;
f. indexing the defined first batch of garments lastly from

the fourth area of isolation for concluding the process; and

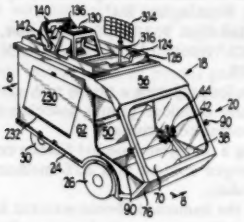
g. performing the steps of the above subparagraphs *a*, *b*, *c*, *d*, *e*, and *f* sequentially on the subsequent batches of garments, whereby the process is carried out simultaneously and progressively in steps on the separate batches of garments alternately being indexed relative to and being held at the respective areas of isolation, so that when a given batch of garments is in a particular one of said areas of isolation, the subsequent batches are in the preceding areas of isolation.

4,032,295

TOY VEHICLE FOR USE WITH A FIGURE TOY

Burton C. Meyer, Downers Grove, and Robert K. Allen, Hinsdale, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 19, 1976, Ser. No. 659,366
Int. Cl.² A63H *17/12*
U.S. Cl. 46—202 **21 Claims**



1. A toy vehicle, comprising:

a frame;

a plurality of rotatably mounted wheels on the frame for rollingly supporting the vehicle on a suitable surface;

a front windshield pivotally mounted at its top to the frame for movement between closed and open positions relative thereto;

biasing means for constantly urging the windshield in an upward direction about its pivotal mounting on the frame toward the open position; and

a lower front portion pivotally mounted to the frame below the windshield, said lower front portion being movable between a first position in engagement with the windshield defining said closed position and a second position pivoted downwardly from said first position to define said open position for gaining access to an interior cab portion of the vehicle.

4,032,296

ELECTROLYTIC CONDUCTIVITY DETECTOR SYSTEM

Randall C. Hall, West Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

Division of Ser. No. 425,116, Dec. 17, 1973, Pat. No. 3,934,193. This application Jan. 12, 1976, Ser. No. 648,517
Int. Cl.² G01N *27/42*, *31/08*, *31/12*
U.S. Cl. 23—253 PC **11 Claims**

1. An electolytic conductivity detector for gas chromatography, said detector comprising:

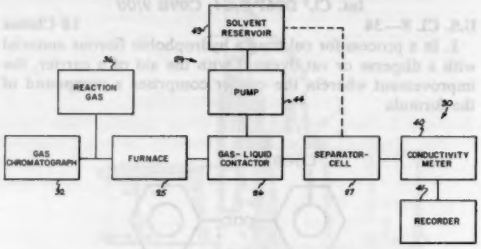
compound supply means for providing as an output therefrom compounds to be tested in the form of eluant gases;

forming mans for receiving said eluant gases from said compound supply means and forming therefrom conductivity supporting inorganic gaseous molecules;

solvent supply means for supplying an aqueous or organic solvent;

contactor means for mixing substantially immediately upon contact gaseous molecules received from said forming means with said solvent from said solvent supply means to form a mixture thereof;

separator means for receiving said mixture from said contactor means and substantially immediately separating said mixture into liquid and gas phases; and



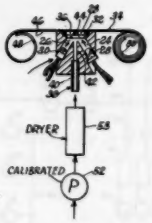
measuring means for receiving said liquid phase from said separator means and measuring the conductivity of said liquid phase.

4,032,297

POLLUTION MONITORING APPARATUS

Norman A. Lyshkow, Chicago, Ill., assignor to Combustion Equipment Associates, Inc., Stanford, Conn.

Continuation of Ser. No. 479,227, June 14, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,855
Int. Cl.² G01N *21/14*, *21/48*, *21/30*
U.S. Cl. 23—254 E **13 Claims**



1. Apparatus for the detection and/or analysis of pollutant gases in a gas stream comprising a light reflective suface sensitive to a pollutant gas for reaction with the pollutant gas to cause a decrease in the reflectivity, light source means positioned to pass a beam of light angularly onto the surface, light-sensing means positioned to receive light reflected from the surface and means to contact a gas stream containing a pollutant gas with the surface whereby the decrease in light reflectivity indicates the concentration of the pollutant gas in the gas stream and the rate of decrease in light reflectivity indicates the dose rate of the pollutant gas in the gas stream.

4,032,298

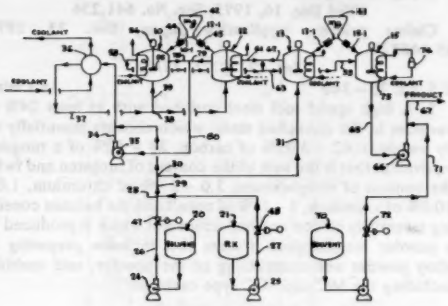
APPARATUS FOR PRODUCTION OF GRIGNARD REAGENT

Guy E. Blackmar, Freeport; Robert C. Wight, Sugarland, and Richard B. Smith, Freeport, all of Tex., assignors to Nalco Chemical Company, Chicago, Ill.

Division of Ser. No. 418,101, Nov. 21, 1973, Pat. No. 3,911,037. This application Dec. 30, 1974, Ser. No. 537,701
Int. Cl.² B01J *8/08*; C07F *3/02*
U.S. Cl. 23—260 **3 Claims**

1. Apparatus for continuous production of Grignard reagent comprising: a plurality of reaction vessels and a surge product holding vessel, pressurized supply means for constantly introducing into said reaction vessels a mixed stream of an organohalide and solvent under pressure, a supply hopper and

feed means associated therewith positioned above each pair of reaction vessels for adding magnesium in incremental amounts to each of said vessels, overflow conduits each connected at one end to each of said vessels at a predetermined high level to afford escape for a Grignard system overflow product, means for collecting and transmitting the overflow product to said surge product holding vessel, a pump for



constantly delivering the contents of the holding vessel for storage or use, a heat exchanger, and conduit means connected at one end to at least one of the reaction vessels at a high level considerably above the bottom thereof for receiving a reacting portion of the contents therefrom, said conduit means also being connected for circulating said reacting portion through the heat exchanger and back to said one reaction vessel.

4,032,299

SPENT CATALYST REGENERATION APPARATUS WITH INTERNAL REGENERATED-CATALYST RECYCLE MEANS

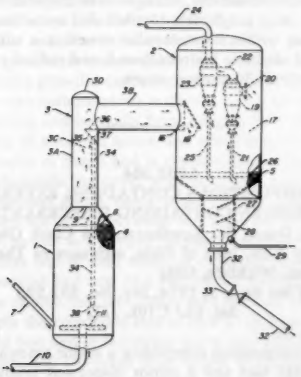
Richard P. Pulak, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 429,422, Dec. 28, 1973, Pat. No. 3,953,175. This application Mar. 15, 1976, Ser. No. 667,247

The portion of the term of this patent subsequent to Apr. 27, 1992, has been disclaimed.

Int. Cl.² B01J *8/08, 8/18, 37/14*

U.S. Cl. 23—288 B **4 Claims**



1. An apparatus for oxidizing coke on spent catalyst which comprises in combination:

a. a spent-catalyst receiving chamber for containing a dense-phase fluidized bed of catalyst having a spent catalyst inlet means and a fresh-regeneration gas inlet means connected thereto to allow passage of spent catalyst and fresh regeneration gas respectively into said chamber and having a regenerated-catalyst/regeneration-gas outlet means connected thereto to allow passage of regenerated catalyst and regeneration gas from said chamber;

b. a transfer conduit positioned above said spent-catalyst receiving chamber and having a substantially vertical portion and a substantially horizontal portion in interconnection with said vertical portion, said vertical portion extending above said horizontal portion and having an inlet connected to the regenerated-catalyst/regeneration-gas outlet means and said horizontal portion extending into the side of a hereinafter described regenerated-catalyst receiving chamber and being provided with an outlet means into said chamber whereby regenerated catalyst and regeneration gas are carried from said spent-catalyst receiving chamber in admixture to said regenerated-catalyst receiving chamber, said portions of said transfer conduit being of sufficient internal volume to permit CO oxidation and transfer of the heat of combustion to said catalyst therein;

c. an internal regenerated-catalyst recycle means, having an inlet means in the transfer conduit and an outlet means in the spent-catalyst receiving chamber, to allow passage of a portion of regenerated catalyst from the transfer conduit to the spent-catalyst receiving chamber; and,

d. a regenerated-catalyst receiving chamber for containing a dense-phase bed of regenerated catalyst, said chamber having a regenerated-catalyst outlet means and a spent-regeneration-gas outlet means connected thereto to allow passage of regenerated catalyst and spent regeneration gas from said chamber.

4,032,300

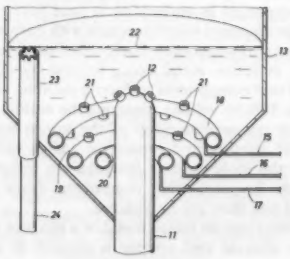
OXYGEN-CONTAINING GAS DISTRIBUTION APPARATUS EMPLOYED IN FLUIDIZED BED REGENERATION OF CARBON-CONTAMINATED CATALYSTS

Wesley A. Parker; John E. Gwyn, and Glenn R. McCullough, all of Pasadena, Tex., assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 574,188, May 5, 1975, Pat. No. 3,974,091, which is a continuation-in-part of Ser. No. 501,514, Aug. 29, 1974, abandoned. This application Apr. 9, 1976, Ser. No. 675,419

Int. Cl.² B01V *8/24, 23/90*

U.S. Cl. 23—288 B **4 Claims**



1. An oxygen-containing gas distribution apparatus for introduction of at least a portion of the oxygen-containing gas required for fluidization and burn-off of carbon deposits of a fluidized bed of carbon-contaminated hydrocarbon conversion catalyst contained in a regeneration chamber, which comprises one or more manifold members substantially horizontally disposed at the lower end of said regeneration chamber in fluid communication with a source of pressured oxygen-containing gas and having connected thereto in fluid communication a plurality of gas discharge nozzles through which

oxygen-containing gas is passed into contact with the dense catalyst phase, characterized in that each gas discharge nozzle is substantially cylindrical in shape having an upstream portion and a downstream portion with a transition portion connecting the upstream and downstram portions wherein said upstream portion is attached to said manifold member, which discharge nozzles are restricted in internal cross-sectional area in its upstream portion and expanded in the internal cross-sectional area of its downstream portion such that a) the numerical ratio of the difference between the diameter of the downstream portion and the diameter of the upstream portion divided by the length of the downstream portion taken in the direction of gas flow does not exceed 0.18 and b) the ratio of the internal diameter of the upstream portion to its length taken in direction of gas flow does not exceed 1.67.

4,032,301

COMPOSITE METAL AS A CONTACT MATERIAL FOR VACUUM SWITCHES

Heinrich Hassler, Wendelstein; Horst Kippenberg, Nurnberg-Weiherhaus, and Horst Schreiner, Nurnberg, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 503,461, Sept. 5, 1974. This application May 6, 1976, Ser. No. 683,690
Int. Cl.² B22F 3/00
U.S. Cl. 428—567 11 Claims

1. A composite inclusion metal for vacuum switches comprising a mixture of copper as a first metal component in an amount from about 35% to 60% by volume of said composite inclusion metal, a second metal component selected from the group consisting of iron and nickel and a getter component selected from the group consisting of chromium, titanium and zirconium; wherein at least one of said second or getter components is embedded in said copper to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being formed by cold-pressing a mixture of said copper, said second metal component and said getter component to form a molding with a porosity of less than 30% by volume, sintering the molding at a temperature below the melting point of the lowest melting component of said mixture in a protective gas or vacuum, and hot-densifying the molding at a temperature below the melting point of the lowest melting component down to a residual porosity of less than 2% by volume.

4. A composite inclusion metal for vacuum switches comprising a mixture of copper or nickel as a first component in an amount of from 35 to 60% by volume of said composite, a second metal component consisting of aluminum wherein said second component is embedded in said first component to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being formed by cold-pressing a mixture of said components to form a molding with a porosity of less than 30% by volume, sintering the molding at a temperature below the melting point of the lowest-melting component of said mixture in a protective gas or vacuum and hot densifying the molding at a temperature below the melting point of the lowest-melting component down to a residual porosity of less than 2% by volume.

10. A composite inclusion metal of a mixture of copper and chromium wherein said copper is present in an amount of from 35 to 60% by volume, said chromium being embedded in said copper to form a heterogeneous microstructure with only isolated bridge formations existing between finely-distributed inclusions, said composite inclusion metal being prepared by mixing the copper and chromium in powder form, cold-pressing the mixture to form a molding with a porosity of less than 30% by volume, sintering the molding in a protective gas or vacuum, the sintering temperature being in the range of from above the melting temperature of said copper to a temperature not exceeding 100° C above said melting temperature, and hot densifying the molding at a temperature below the melting point of the copper down to a residual porosity of less than 2% by volume.

4,032,302

CARBIDE ENRICHED HIGH SPEED TOOL STEEL

Hideki Nakamura, Yasugi, and Kingo Kiyonaga, Yonago, both of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Dec. 16, 1975, Ser. No. 641,236
Claims priority, application Japan, Dec. 23, 1974, 49-146820
Int. Cl.² C22C 33/02
U.S. Cl. 75—240 14 Claims

1. A high speed tool steel enriched with at least 24% of carbides in the quenched state, which consists essentially of, by weight, 0.62 – 3.95% of carbon, 24 – 50% of a tungsten equivalent that is the sum of the content of tungsten and twice the content of molybdenum, 3.0 – 5.0% of chromium, 1.0 – 10.0% of vanadium, 5 – 15% of cobalt and the balance consisting essentially of iron and impurities and which is produced by a powder metallurgical process that includes preparing an alloy powder and compacting of the powder, said carbides including the MC and M_6C type carbides.

4,032,303

FUEL COMPOSITIONS CONTAINING ESTERS AND ESTER-TYPE DISPERSANTS

Casper John Dorer, Jr., Lyndhurst, and Clark Ober Miller, Willoughby Hills, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Oct. 1, 1975, Ser. No. 618,658
Int. Cl.² C10L 1/18
U.S. Cl. 44—70 9 Claims

1. A fuel composition comprising:
a major amount of
A. a normally liquid fuel and, dissolved therein,
the combination of:
B. about 50–500 parts by weight, per million parts of component A, of at least one ester selected from the group consisting of
1. esters of polyols containing at least 3 hydroxy groups and C_{8-18} aliphatic monocarboxylic acids, and
2. esters, containing about 30–80 carbon atoms, of an alkanol and an alkyl-based succinic or alkenyl-based succinic acid; and
C. about 80–400 parts, per million parts of component A, of at least one oil-soluble, nitrogen-free dispersant which is an ester of a polyhydric alcohol and a carboxylic acid which has within its molecular structure a substantially saturated aliphatic hydrocarbon-based radical containing at least about 30 carbon atoms.

4,032,304

FUEL COMPOSITIONS CONTAINING ESTERS AND NITROGEN-CONTAINING DISPERSANTS

Casper John Dorer, Jr., Lyndhurst, and Clark Ober Miller, Willoughby Hills, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

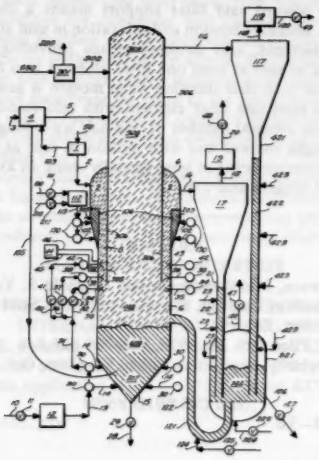
Filed Sept. 3, 1974, Ser. No. 502,593
Int. Cl.² C10L 1/22
U.S. Cl. 44—70 19 Claims

1. A fuel composition comprising a major amount of (A) a normally liquid fuel and a minor dispersant amount of the combination of; (B) at least one liquid ester of a C_{10-30} alkanol and an alkyl succinic or alkenyl succinic acid in which the alkyl or alkenyl group contains about 10–20 carbon atoms; and (C) an oil soluble nitrogen-containing dispersant having within its molecular structure a substantially saturated aliphatic hydrocarbon-based radical having at least about 50 carbon atoms.

4,032,305
TREATING CARBONACEOUS MATTER WITH HOT STEAM

Arthur M. Squires, 245 W. 104 St., New York, N.Y. 10025

Filed Oct. 7, 1974, Ser. No. 513,037
Int. Cl.² C10J 3/54, 3/56
U.S. Cl. 48—73 6 Claims



1. A process for gasifying carbonaceous matter by treatment with hot steam to yield a fuel gas containing hydrogen, carbon monoxide, and methane, comprising:

a. fluidizing granular carbonaceous material in a first fluidized bed extending continuously from substantially the bottom to substantially the top of a first space, and wherein said bed is maintained at a temperature between about 1,400° and 1,900° F;

b. supplying carbonacious matter to said bed, and wherein said matter is selected from the group consisting of coals, cokes, lignites, asphalt, coal tar, heavy coker tars, bitumens, petroleum resudua, Gilsonite, and kerogen, and wherein said granular carbonaceous material originates from said carbonaceous matter and includes fine particulate material;

c. supplying a gas comprising primarily steam as fluidizing gas to the bottom of said first bed and thereby converting at least a part of said carbonaceous matter by its endothermic reaction with steam to a fuel gas containing hydrogen, carbon monoxide, and methane;

d. fluidizing granular carbonaceous material also originating from said carbonaceous matter in a second fluidizing bed extending continuously from substantially the bottom to the top of a second space, and wherein said second space is annular in shape and is concentrically disposed within and alongside the upper portion of first space, the top of said second space being open to said first space at a selected elevation between top and bottom of said first space, so that said second fluidized bed is contiguous with said first bed at said selected elevation and gas leaving said second bed acts as a part of the fluidizing gas to the region of said first bed above said selected elevation, and wherein the combined rate of flow of said gas leaving said second bed and of fluidizing gas in said first bed reaching said selected elevation from below is sufficient to maintain a fast fluidized condition of said fine particulate material in said region of said first bed;

e. supplying a gas containing oxygen as fluidizing gas to said second bed, thereby sustaining combustion of said granular carbonaceous material in said second bed and generating heat that passes by conduction into said first bed;

f. withdrawing gas together with said fine particulate material from substantially the top of said first space and said second space;

g. substantially separating said withdrawn gas from said withdrawn fine particulate material;

h. discharging said gas;

i. feeding said separated fine particulate material into a third fluidized bed wherein said fine particulate material is maintained in the slow fluidized condition; and

j. feeding said separated fine particulate material from said third fluidized bed into said first fluidized bed at a rate sufficient to maintain a fast fluidized zone in said region of said first bed above said selected elevation.

5. Apparatus for conducting endothermic reactions of carbonaceous matter in a treatment by contact with hot steam, comprising:

a. a vessel;

b. a vertical annular partition means connected at its upper and thereof to the interior wall of said vessel and forming a central first space and an annular second space within said vessel said first space extending from the bottom of said partition to the top of said vessel, and wherein the bottoms of said spaces are open to a third space within said vessel and subposed beneath said first and second spaces, and a fourth space subposed beneath and in communication with said third space;

c. means connected to said first space and said fourth space for feeding a carbonaceous matter into said vessel;

d. means for establishing in said first space a hot fluidized bed of particulate matter including fine particles and originating from said carbonaceous matter;

e. means for establishing hot fluidized beds in said second and third spaces of particulate matter originating from said carbonaceous matter, and wherein said means for establishing hot fluidized beds in said first, second, and third spaces include means for introducing gas comprising primarily steam as a fluidizing gas to substantially the bottom of said third space;

f. means for introducing a hot gas into said first space at a selected elevation of said first space, and wherein said means for introducing a gas comprising primarily steam and said means for introducing a hot gas are capable of sustaining rates of said introductions such as to maintain a rate of flow of fluidizing gas in the region of said first space above said selected elevation sufficient to establish a fast fluidized bed of said fine particles in said region;

g. means for withdrawing and separating gas and fine particles from the top of said second space;

h. means for withdrawing and separating gas and fine particles from the top of said first space;

i. pipe means for each of said separating means for discharging said separated gas; and

j. means for conducting said separated particles from said separating means (g) and (h) into said third space at a rate of flow sufficient to establish a fast fluidized bed zone of said paricles in said third space.

4,032,306
ISOTOPE SEPARATION BY PHOTODISSOCIATION OF VAN DER WAAL'S MOLECULES

Yuan T. Lee, Berkeley, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 8, 1976, Ser. No. 664,858
Int. Cl.² B01J 1/10
U.S. Cl. 55—17 12 Claims

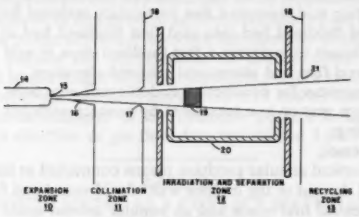
1. A method for separating isotopes by photo-induced dissociation of molecules of a Van der Waal's complex represented by A-B wherein A is a molecular species in which an element is present in a plurality of isotopes, ^{1}A representing those molecules of A containing a first such isotope and ^{2}A representing those molecules of A containing a second such isotope and B is a species different from A and capable of being bound to A by Van der Waal's forces, the molecules of ^{1}A in ^{1}A.B being capable of absorbing radiation in a given spectral region and being vibrationally excited thereby to a significantly

greater degree than the molecules of ^3A in $^3A.B$, which comprises:

forming a beam of molecules of said Van der Waal's complex A.B;

subjecting the beam of Van der Waal's molecules to radiation in the given spectral region, thereby vibrationally exciting the molecules of ^1A in $^1A.B$ and inducing dissociation of the thus excited molecules of $^1A.B$ into products ^1A and B without substantially exciting the molecules of ^3A in $^3A.B$ and without substantially dissociating molecules of $^3A.B$, the excited molecules of $^1A.B$ dissociating with sufficient recoil velocity to substantially deflect the products ^1A and B from the molecular beam; and

recovering the deflected dissociation product substantially enriched in ^1A.



4,032,307

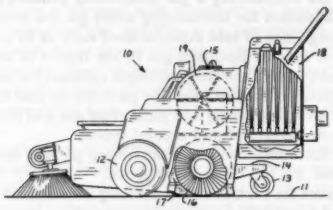
METHOD AND APPARATUS FOR CLEANING FILTER MEANS

George L. Sommerfeld, Minneapolis, Minn., assignor to Tennant Company, Minneapolis, Minn.

Filed Nov. 28, 1975, Ser. No. 636,160

Int. Cl.² B01D 46/04

U.S. Cl. 55—96 20 Claims



1. In dust control apparatus having dust transporting means and including means operatively connected to differential pressure generating means for establishing air flow therethrough; filter means interposed to filter said air flow, the improvement comprising:

a. housing means having opposed filter support means mountably retaining said filter means in a tensioned relationship therebetween, a first port formed in said housing means and defining an air inlet thereto, and a plenum chamber within said housing means in communication with the clean air side of said filter means and a second port formed in said housing means defining a clean air outlet from said plenum chamber, said differential pressure generating means establishing air flow from said inlet, across said filter means and through said plenum-chamber to said outlet;

b. said filter means comprising at least one filter element with said at least one filter element being a generally flexible structure having a longitudinal axis and with a surface thereof being disposed within said plenum chamber;

c. shaker frame means, and means coupling said shaker frame to one end of said at least one filter element in a direction generally along the longitudinal axis of said at least one element;

d. stroking means operatively coupled to said shaker frame means for imparting reciprocatory stroking motion to said shaker frame with a component of said stroking motion being generally along the longitudinal axis of said at least one filter element, the stroke length of said stroking means being sufficient to move said shaker frame means toward said filter support means a distance to impart alternate tension and relaxation in said at least one filter element, said stroking means providing stroking motion to said at least one filter element at a frequency selected such that standing wave motion is generated in said at least one filter element with said standing wave being an integral number of one-half wave lengths along the length thereof and with motion in said at least one filter element being at least partially along an axis normal to said longitudinal axis.

4,032,308

FILTERING A GAS STREAM

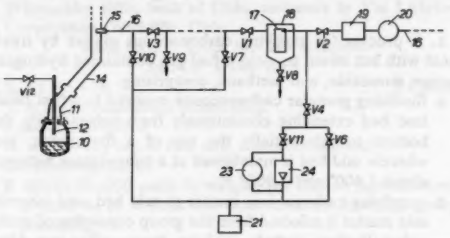
Robert Lawson, Middlesbrough, and Reginald S. Young, Uxbridge, both of England, assignors to British Steel Corporation, London, England

Filed Oct. 28, 1975, Ser. No. 626,046

Claims priority, application United Kingdom, Oct. 28, 1974, 46431/74

Int. Cl.² B01D 46/04

U.S. Cl. 55—96 6 Claims



1. A method of removing particulate matter from a gas stream having particulate matter suspended therein, comprising passing the gas stream through a filter mounted within a housing having a dirty gas stream inlet and a clean gas stream outlet together with a valve-controlled outlet opening directly to the atmosphere and positioned on the inlet side of the filter, whereby particulate matter is trapped by the filter, and cleaning the filter of trapped particles during an interval in which the passage of the gas stream through said inlet and outlet is stopped; said cleaning comprising pressurising the housing such that both sides of the filter are at the same high pressure, and subsequently releasing the pressure with explosive rapidity directly to the atmosphere through said valve-controlled outlet to thereby shock the accumulated particules from said filter.

4,032,309

PREPARATION OF MICROPOROUS POLYCARBONATE RESIN MEMBRANES

Robert M. Salemme, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 456,970, April 1, 1974, abandoned. This application Apr. 16, 1976, Ser. No. 677,716

Int. Cl.² B01D 13/04, 31/00, 39/16; B29D 27/04

U.S. Cl. 55—158 12 Claims

1. A method for the preparation of porous polycarbonate resin membranes comprising the steps of:

a. preparing a casting solution at room temperature consisting of polycarbonate resin material and a casting solvent

composed of one or more good solvents, said casting solution being stable at room temperature,

b. casting a layer of the casting solution so formed on a smooth, clean surface of supporting means,

c. permitting desolvation to occur for a predetermined time interval from said layer,

d. immersing said layer and supporting means in a quenching bath liquid, said quenching bath liquid having the capabilities for dissolving said casting solvent and for causing swelling of the polycarbonate resin content of said layer while being a non-solvent for the polycarbonate resin, said immersion step initiating formation of a microporous membrane by entry of the quenching bath liquid into said layer and exit of casting solvent therefrom.

e. removing said microporous membrane from said quenching bath and

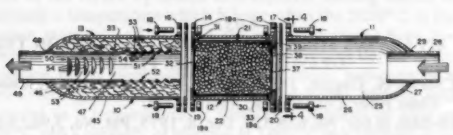
f. removing the remaining casting solvent and quenching bath liquid from said microporous membrane.

12. The substantially isotropic microporous polycarbonate resin membrane produced by the process of claim 1.

4,032,310
MUFFLER AND EXHAUST GAS PURIFIER FOR INTERNAL COMBUSTION ENGINES

Vincent E. Ignoffo, 7040 W. Newport, Chicago, Ill. 60631

Continuation of Ser. No. 470,180, May 15, 1974, abandoned.
This application Nov. 3, 1975, Ser. No. 627,963
Int. Cl.² B01D *50/00*
U.S. Cl. 55—276 2 Claims

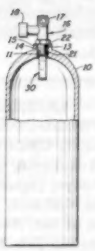


1. An exhaust gas purifier for connection to exhaust gas pipes in a gas exhaust system of an internal combustion engine comprising a shell adapted for axial flow therethrough of exhaust gases from an upstream end to a downstream end of said shell, said shell being axially segmented into an upstream shell segment, a downstream shell segment, and an intermediate shell part embodying at least one intermediate shell segment, said intermediate shell part being between and coaxial with said upstream and downstream shell segments, a tube projecting from the upstream end of said upstream shell segment for connection to one portion of an exhaust pipe of said gas exhaust system, an additional tube extending through said downstream shell segment and projecting from the downstream of said downstream shell segment for connection to another portion of said exhaust pipe of said gas exhaust system, annular flanges on the axial ends of said intermediate part, an annular flange on each of said upstream and downstream shell segments at the respective end of each which is in respective opposing, facing relationship with the annular flanges of said intermediate part, disconnectable fastening means for respective pairs of said flanges which are in said facing relationship to releasably hold said intermediate part and the respective upstream and downstream shell segments together as a unit, a replaceable cartridge with foraminous upstream and downstream end walls and filled with small particles of exhaust gas purifying material, said cartridge substantially filling said intermediate part of said shell, said additional tube providing a tubular core extending axially through said downstream shell segment surrounded by an annular space between said tubular core and said downstream shell segment, fiber glass sound-absorbing means in said annular space, the upstream ends of said annular space and said additional tube being in open communication with the downstream end of said cartridge in said intermediate shell part for flow of exhaust gases from said cartridge into said additional tube and also into said annular space, openings in the tubular wall of said core for flow of exhaust gases from said cartridge both directly through said core and also through said sound-absorbing means and via said openings into said core, and said cartridge being removably mounted in said intermediate shell part by a ring flange gasket mounted on one end of said cartridge and seated between opposed faces of one of said annular flanges of said intermediate part and the flange of one of said shell segments in facing relationship thereto, whereby, upon disconnection of said fastening means, said intermediate part and the cartridge therein may be removed from its position between said upstream and said downstream shell segments without disconnecting said shell segments from their respective portions of said exhaust pipe of the gas exhaust system whereupon said cartridge may be withdrawn immediately from said intermediate part for inspection or replacement of the cartridge.

4,032,311
TANK FILTER

Jack L. Bohmrich; William A. Bowden, Jr., both of Glenview, and Vernon G. Pedersen, Chicago, all of Ill., assignors to Dacor Corporation, Northfield, Ill.

Filed June 1, 1976, Ser. No. 691,389
Int. Cl.² B01D *50/00*
U.S. Cl. 55—385 C 6 Claims



1. In combination,

a pressurizable vessel having a single inlet-outlet port,

manually operable valve means including a housing having a valve passageway therethrough sealably mounted to said vessel across said port,

said valve means including a tube connected to said passageway and extending through said port into said vessel,

said tube having an open distal end for communicating said valved passageway with the chamber in said vessel,

a tubular filter member comprising a mass of minute fibrous members having surfaces against which particles are held by intermolecular forces of attraction irrespective of the direction of fluid flow therethrough to remove entrained particles from fluid entering and exiting the vessel,

said filter member being positioned over said tube in spaced concentric relationship therewith to provide an annular chamber disposed between said tube and said filter member,

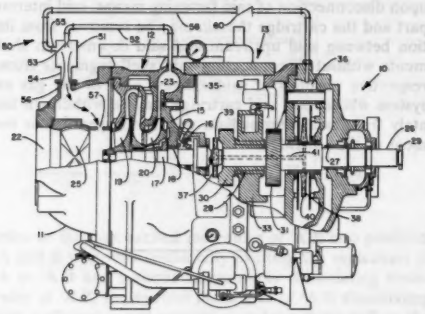
a tubular connector press fitted onto the distal end of said tube and having a laterally extending hole therethrough communicating with the open distal end of said tube for connecting said passageway to said annular chamber, and

end cap means removably secured to said connector and holding said filter member in place over said tube in sealing relationship with said housing.

4,032,312
CENTRIFUGAL COMPRESSOR

Carl M. Anderson, Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Apr. 16, 1976, Ser. No. 677,584
Int. Cl.² F25B 1/00; F01D 11/00, 25/16; F03B 11/00
U.S. Cl. 62—498 7 Claims



1. In a centrifugal compressor, as employed in a refrigeration system, of the type having a hermetically sealed housing containing an impeller section and a transmission section separated by a wall through which passes the impeller shaft, the improvement comprising

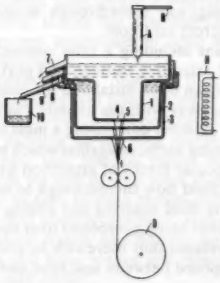
separator means for isolating refrigerant vapor contained within the transmission section, and

pump means operatively connected to the transmission section and being arranged to draw the isolated refrigerant vapor from the transmission whereby the pressure of the atmosphere contained within the transmission section is substantially reduced.

4,032,313
APPARATUS FOR PRODUCING OPTICAL FIBERS BY USING CRUCIBLES

Mituhiro Tokuhara, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 650,062, Jan. 19, 1976, abandoned, which is a continuation of Ser. No. 510,712, Sept. 30, 1974, abandoned. This application July 15, 1976, Ser. No. 705,518
Claims priority, application Japan, Oct. 4, 1973, 48-111017
Int. Cl.² C03B 37/02
U.S. Cl. 65—1 2 Claims



1. An apparatus for producing an optical fiber using crucibles which comprises:

heating means for heating materials to be melted for forming the optical fiber,

a melting unit arranged to be heated by said heating means, said melting unit comprising at least two nested crucibles including an upper crucible and a lower crucible with said upper crucible positioned within said lower crucible, each said crucible comprising a bottom wall and side walls extending upwardly from said bottom wall, said bottom wall of said upper crucible spaced upwardly from said bottom wall of said lower crucible, each of said upper and lower crucibles having an upper end with an opening therein, each of said crucibles being provided with a one-hole spinnerette positioned in said bottom wall thereof, and the spinnerette holes of the crucibles being in vertically spaced alignment,

overflow passage means provided in said side walls of at least one of said crucibles below the upper ends thereof and arranged so that when the molten material contained therein exceeds a predetermined level, the excess portion of the molten material is permitted to overflow therethrough,

material supply means for supplying the optical fiber materials into the opening of said crucibles in amounts such that excess portions of the molten materials located above the level of said overflow passage means overflow from said overflow passage means during the entire spinning operation, wall means located exteriorly of said crucibles for receiving the overflow of molten materials from said overflow passage means, and

fiber drawing means located below said spinnerette holes and arranged to spin the optical fiber while drawing those portions of the molten materials which outflow through said spinnerette holes.

4,032,314
APPARATUS FOR CONTROLLING FLOODING IN THE DRAWING OF GLASS FIBERS

Charles H. Coggin, Jr., Glendora, Calif., assignor to Kaiser Glass Fiber Corporation, Azusa, Calif.

Division of Ser. No. 638,526, Dec. 8, 1975, Pat. No. 3,982,915. This application May 17, 1976, Ser. No. 686,994
The portion of the term of this patent subsequent to Sept. 28, 1993, has been disclaimed.
Int. Cl.² C03B 37/02
U.S. Cl. 65—1 12 Claims

1. In a glass fiber drawing assembly of the type having a non-tip orifice plate with a flat undersurface through which fibers are drawn, an improved orifice plate for use in the assembly, said plate comprising: a drawing area having a plurality of drawing orifices extending therethrough and a flat undersurface through which said orifices open, said orifices being arranged in paired sets with the orifices within each set being of substantially the same diameter and spaced from one

another by a center-to-center distance equal to from 1.2 to 1.45 times said diameter, and the respective sets spaced from one another by a distance greater than the distance between the orifices within the sets, whereby, in the event of the breakage of a fiber being drawn from one of the orifices of a set, the glass supplied to said one orifice will flood to and join the glass being drawn from the other of the orifices in said set prior to flooding to the orifices of other of said sets.

4,032,315

METHOD FOR THE PRODUCTION OF QUARTZ-GLASS OBJECTS BY DRAWING

Gerardus Henricus Antonius Maria van der Steen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,535

Claims priority, application Netherlands, Nov. 18, 1974, 7414978

Int. Cl.² C03B 5/16

U.S. Cl. 65—32 **1 Claim**

1. A method for continuously producing elongated objects of quartz glass which comprises: feeding continuously starting material consisting of silicon dioxide in particle form at a predetermined rate into the upper part of a heated furnace, melting continuously the starting material in the upper, heated zone of the furnace in a gas atmosphere of hydrogen and helium in a ratio by volume of 40–65% of hydrogen to 60–35% of helium and at a melting temperature which is not below 2050° C, heating of the molten material thereafter in the lower zone of the furace by means of a separate heating means to maintain a temperature which is lower than the 2050° C in the molten material and drawing the molten material from the lower zone of the furnace by means of a forming device in the presence of an atomosphere which contains hydrogen in a non-oxidizing carrier gas cooling said material, heating said material to a temperature of between a plurality of days at 800° C and a plurality of minutes at 1400° C in a vacuum or in air and, thereafter heating at a temperature of at least 1600° C for a plurality of minutes.

4,032,316

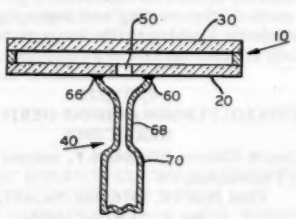
METHOD OF SEALING A GLASS/TUBULATION TO A PLATE

Bernard Caras, Princeton, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 26, 1975, Ser. No. 635,736

Int. Cl.² C03B 29/00; C03C 27/00

U.S. Cl. 65—41 **4 Claims**



1. The method of forming a gas-filled display panel assembly comprising the steps of forming a glass tube and an apertured base plate of said display panel assembly to which said tube is to be sealed in alignment with said aperture, storing said tube and said plate until they are sealed together and wherein said tube is subject to surface defects being formed therein during storage and handling, vertically supporting said tube in a horizontally disposed carrier, heating said vertically supported tube in said carrier to a predetermined temperature and holding said tube at said temperature at which the surface of said tube flows assisted by the flow of gravity whereby said surface defects are removed and the surface assumes a pristine state, and heat sealing said defect free tube to said apertured base plate.

4,032,317

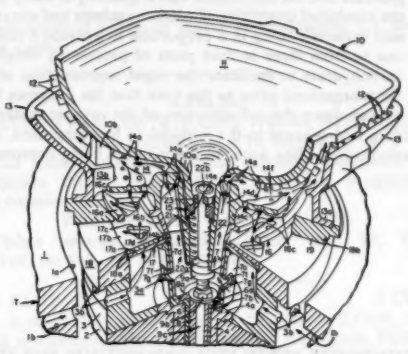
GLASS FORMING MOLD AND TEMPERATURE CONTROL APPARATUS THEREFOR

Arieh Carmi, Big Flats; Richard A. Potter, Horseheads, and Alan G. Ryder, Elmira, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Nov. 15, 1976, Ser. No. 742,286

Int. Cl.² C03B 11/12

U.S. Cl. 65—161 **8 Claims**



5. In combination with a glass forming mold (**10**) including a generally bowl-shaped upper portion and a lower central tubular portion (**10***a*) and used for forming generally funnel-shaped articles, an apparatus assembly for directing, distributing and selectively controlling flow of cooling fluid about the outer surface of said mold (**10**) for selective temperature control thereof, such apparatus assembly comprising:

I. a generally annular cooling fluid receiving and guide member (**3**) embodying an inner annular plenum chamber (**3***a*);

II. first adjustable fluid flow control means (**7**) having a fluid inlet side (**7***a*) adjacent the inner limits of said plenum chamber (**3***a*) and a fluid outlet side (**7***d*);

III. second adjustable fluid flow control means (**17**) having a fluid inlet side (**17***a*) above said plenum chamber (**3***a*) and a fluid outlet side (**17***b*);

IV. a perforated baffle member (**14**) embodying a plurality of relative small orifices (**14***a*) extending generally vertically therethrough and embodying a second plenum chamber (**14***d*) surrounding said tubular portion of said mold (**10**) and in fluid flow communication with said fluid outlet side (**7***d*) of said first fluid flow control means (**7**) and a main outer plate portion (**14***f*) disposed below and spaced from the lower portion of said bowl-shaped portion of said mold (**10**) and in fluid flow communication with said fluid outlet side (**17***b*) of said second fluid flow control means (**17**); and

V. an enclosure member (**13**) surrounding the upper portion of said bowl-shaped portion of said mold (**10**) and spaced from the outer surface thereof to provide a fluid flow path leading from the space between said main portion (**14***f*) of said baffle member (**14**) and said lower portion of said bowl-shaped portion of said mold (**10**) into the space between the enclosure (**13**) and said outer surface of said upper portion of said bowl-shaped portion of said mold (**10**).

4,032,318
COMPOSTING MIXTURE

Donald E. Lovness, Stillwater, Minn., assignor to Judd Ringer Corporation, Eden Prairie, Minn.

Continuation-in-part of Ser. No. 391,074, Aug. 24, 1973, abandoned. This application July 7, 1975, Ser. No. 593,472
Int. Cl.² C05F 9/04
U.S. Cl. 71—9 9 Claims

1. A method of facilitating the rapid decomposition of organic matter to be composted, said method comprising:

preparing a mixture of a quantity of microorganisms for digesting the organic material, said microorganisms including both aerobic and anaerobic bacteria, and a quantity of enzymes for breaking down the cell structure of the organic material to enable it to be digested by the microorganisms which is many times that which is inherently otherwise present in organic material to be composted,

including in said mixture a quantity of materials rich in proteins and carbohydrates which quantity is many times the combined quantities of microorganisms and enzymes, said materials being in a proportion to provide a ratio of one to from three to four parts of protein by weight to carbohydrate to facilitate the rapid reproduction of the microorganisms prior to the time that the enzymes have broken down the cell structure of the organic material,

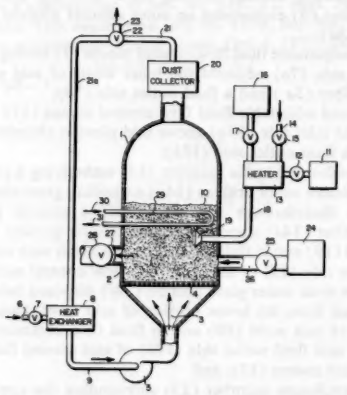
adding said mixture to the material to be composted, and

periodically adding water to the material being composted.

4,032,319
COMPOSITE FERTILIZER AND METHOD FOR ITS MANUFACTURE

Jack Lee Smith; Charles Raymond Crowley, and Roger Benton Humberger, all of Pocatello, Idaho, assignors to J. R. Simplot Company, Boise, Idaho

Continuation-in-part of Ser. No. 371,439, June 19, 1973, abandoned. This application Oct. 24, 1975, Ser. No. 625,723
Int. Cl.² C05B 7/00
U.S. Cl. 71—34 10 Claims



1. A composite fertilizer particle having a fertilizer particle core selected from the group consisting of normal superphosphate, enriched superphosphate, triple superphosphate, monocalcium phosphate, monoammonium phosphate, diammonium phosphate, and ammonium polyphosphate and a non-uniform, discontinuous particulate water-permeable coating comprising sulfur.

4,032,320
SYNERGISTIC HERBICIDAL MIXTURES OF 4-CHLORO-2-OXOBENZOTHIAZOLIN-3-YLACETIC ACID AND 2-METHOXY-3,6-DICHLOROBENZOIC ACID

Gerald Bertram Lush, Nottingham, England, assignor to The Boots Company Limited, Nottingham, England

Continuation of Ser. No. 314,571, Dec. 13, 1972, abandoned, which is a continuation of Ser. No. 88,988, Nov. 12, 1970, abandoned, which is a continuation of Ser. No. 770,099, Oct. 23, 1968, abandoned. This application Mar. 31, 1975, Ser. No. 563,718
Claims priority, application United Kingdom, Oct. 31, 1967, 49487/67
Int. Cl.² A01N 9/12
U.S. Cl. 71—90 6 Claims

1. A herbicidal composition, which is useful in the treatment of Matricaria spp., consisting essentially of an inert carrier and a herbicidally effective amount of an essential synergistic mixture of

a. an alkali metal salt of 4-chloro-2-oxobenzothiazolin-3-ylacetic acid, and

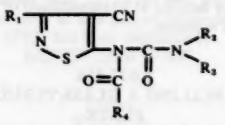
b. an alkali metal salt of 2-methoxy-3,6-dichlorobenzoic acid, the amounts being expressed in terms of the free acid in both instances and the weight proportions of (a) and (b) being from 1–2.5:1.

4,032,321
N,N-DIALKYL-N'-(SUBSTITUTED-5-ISOTHIOAZOLYL)-N'-ACYLUREAS AS HERBICIDES

Loren Kenneth Gibbons, Medina, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed June 18, 1976, Ser. No. 697,454
Int. Cl.² C07D 275/02
U.S. Cl. 71—90 6 Claims

1. A substituted isothiazolylurea of the formula:



in which R_1, R_2, R_3 and R_4 are straight or branched alkyls of 1 to 4 carbons.

5. An herbicidal composition comprising an herbicidally effective amount of a compound of claim 1 in admixture with an agriculturally acceptable extender.

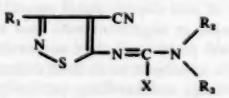
6. A method of preventing and destroying plant growth which comprises applying to the locus to be protected an herbicidally effective amount of a compound of claim 1.

4,032,322
ISOTHIAZOLYLFORMAMIDINE DERIVATIVES AS HERBICIDES

Loren Kenneth Gibbons, Medina, N.Y., assignor to FMC Corporation, Philadelphia, Pa.

Filed June 18, 1976, Ser. No. 697,456
Int. Cl.² C07D 275/02
U.S. Cl. 71—90 15 Claims

1. A substituted formamidine of the formula:



in which R_1 is a straight or branched alkyl of 1 to 4 carbons; R_2 and R_3 are alkyl of 1 to 4 carbons; and X is hydrogen, fluorine, chlorine, bromine, or carbonitrile.

14. An herbicidal composition comprising an herbicidally

effective amount of a compound of claim 1 in admixture with an agriculturally acceptable extender.

15. A method of preventing and destroying plant growth which comprises applying to the locus to be protected an herbicidally effective amount of a compound of claim 1.

4,032,323
ISOTHIAZOLE DERIVATIVES

David Buttimore, Leigh-on-Sea, England, assignor to May & Baker Limited, England

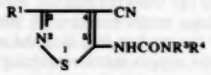
Continuation of Ser. No. 417,192, Nov. 19, 1973, Pat. No. 3,922,160, which is a division of Ser. No. 241,833, April 6, 1972, abandoned. This application May 19, 1975, Ser. No. 578,870

Claims priority, application United Kingdom, Apr. 7, 1971, 9019/71

Int. Cl.² C07D 275/02

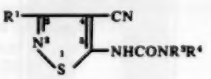
U.S. Cl. 71—90 16 Claims

1. An isothiazole of the formula:



wherein R^1 represents a straight or branched-chain alkyl group containing 1 to 3 carbon atoms and R^3 and R^4 which may be the same or different are each methyl or ethyl or a salt of such an isothiazole with an alkali metal or a herbicidally acceptable strong organic base.

5. A selective herbicidal composition for controlling growth of unwanted plants among crop plants which comprises, as active ingredient, an amount effective to control the growth of said unwanted plants without destroying said crop plants of an isothiazole of the formula:



wherein R^1 represents a straight or branched-chain alkyl group containing 1 to 3 carbon atoms and R^3 and R^4 which may be the same or different are each methyl or ethyl or a salt of such an isothiazole with an alkali metal or a herbicidally acceptable strong organic base in association with a compatible herbicidally-acceptable diluent or carrier.

16. A composition according to claim 5 which contains, in addition to the said isothiazole, an insecticide, fungicide, plant growth regulator or fertilizer.

4,032,324
SYNERGISTIC HERBICIDAL COMPOSITION FOR THE CONTROL OF WEEDS

Wilfried Faust, Cologne, and Kurt Westphal, Wuppertal-Vohwinkel, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

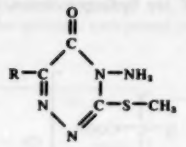
Division of Ser. No. 885,367, Dec. 15, 1969, Pat. No. 3,909,234. This application Apr. 3, 1975, Ser. No. 565,028

Claims priority, application Germany, Dec. 17, 1968, 1815145

Int. Cl.² A01N 9/22

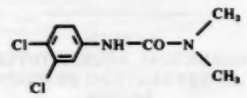
U.S. Cl. 71—93 7 Claims

1. A herbicidal composition which consists essentially of a herbicidally effective amount of a combination of either 3-methylmercapto-4-amino-6-isopropyl-1,2,4-triazin-5-one or 3-methylmercapto-4-amino-6-tert.-butyl-1,2,4,-triazin-5-one of the formula



wherein

R represents i-C_3H_7 or t-C_4H_9, with N'-(3,4-dichlorophenyl)-N,N-dimethyl-urea of the formula



in admixture in a ratio by weight of substantially 1:1, and an inert carrier.

4,032,325
METHOD FOR CONTROLLING WEEDS WITH AMINO ACID HIGHER ALKYL ESTERS

Takao Kida, Yokosuka; Hiroshi Mizuno, Yokohama, and Masaru Okutsu, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

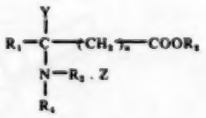
Filed Oct. 15, 1974, Ser. No. 514,745

Claims priority, application Japan, Oct. 19, 1973, 48-118316; Feb. 14, 1974, 49-18050

Int. Cl.² A01N 9/22, 9/14, 9/24

U.S. Cl. 71—95 6 Claims

1. A method for controlling *Lobelia chinensis* LOUR, *Lindernia procumbens* PHILCOX, *Vandellia Angustifolia* BENTH, *Dopatrium junceum* HAMILT, *Ludwigia prostrata* ROXB., *Rotala indica* KOEHNE, *Elatine triandra* SCHK, *Callitriche Verna L.*, *Monochoria vaginalis* PRESL., *Aneilema Keisak* HASSK., *Echinochloa Oryzicola* VASING, *Spirodela polyrhiza* SCHLEID., *Lemna paucicostata* HEGELM, *Potamogeton distinctus* A. BENN., *Cyperus difformis L*, *Eleocharis acicularis* ROME et SCHULT, *Amaranthus viridis* L., or *Digifaria adscendens* HENR. weeds, which comprises applying to said weeds, or the locus where said weeds are growing or will grow, a herbicidal amount of an active compound selected from the group consisting of acid addition products of higher alkyl esters of amino acids, acid addition salts of N-lower alkyl substitution products of said esters and quaternary ammonium salts of N-lower alkyl substitution products of said esters wherein said active compound is selected from compounds of formula (1)

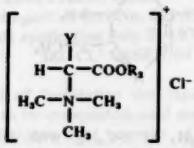


(1)

wherein R_1 is a member selected from the group consisting of a hydrogen atom, alkyl containing 1 to 4 carbon atoms,

R_2 is alkyl containing 8 to 22 carbon atoms, Y is a hydrogen atom or methyl, each of R_3 and R_4 is a member selected from the group consisting of a hydrogen atom and lower alkyl of 1 to 4 carbon atoms, Z is an inorganic or organic acid group selected from the group consisting of hydrochloric acid, acetic acid, p-toluene sulfonic acid, oxalic acid and pyroglutamic

acid, *n* is 0 or an integer of 1 to 5 and, when an integer of 1 to 5, both R_1 and Y are hydrogen atoms, and compounds of formula (2)



(2)

wherein Y and R_2 are the same as defined above.

4,032,326

HERBICIDAL 2-SUBSTITUTED ARYL-4,5,6,7-TETRAHYDRO-2H-ISOINDOLE-1,3-DIONES

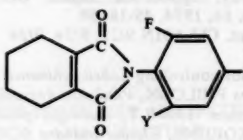
Steven Jerome Goddard, West Grove, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 536,322, Dec. 24, 1974, Pat. No. 4,001,272, which is a continuation-in-part of Ser. No. 502,968, Sept. 3, 1974, abandoned. This application Aug. 26, 1975, Ser. No. 607,895

Int. Cl.² A01N *9/22*

U.S. Cl. 71—96 **17 Claims**

1. A composition for the control of undesirable vegetation consisting essentially of a herbicidally effective amount of a compound of the formula



wherein X is Cl, Br or F, and Y is H, and at least one of (a) a surface-active agent and (b) an inert solid or liquid diluent.

4,032,327

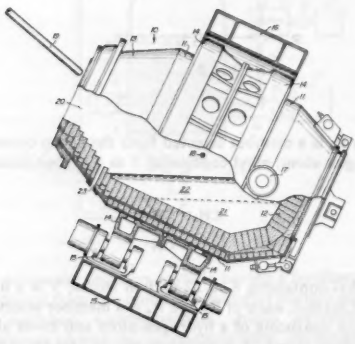
PYROMETALLURGICAL RECOVERY OF COPPER FROM SLAG MATERIAL

John W. Donaldson; Sheree N. Sharma, both of Salt Lake City, Utah, and Nicholas John Themelis, Stamford, Conn., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Aug. 13, 1975, Ser. No. 604,123

Int. Cl.² C22B *15/00*; C21B *3/04*

U.S. Cl. 75—72 **6 Claims**



1. A cyclic, two-stage process for recovering essentially all copper values present in molten slag, comprising: (a) subjecting a charge of the molten slag to vigorous agitation in a rotary reactor rotating at a speed of at least about 10 rpm; (b) adding a carbonaceous or hydrogenous reductant to said charge of molten slag in the rotating reactor to reduce magnetite and to produce a high-grade matte, containing at least about 70% copper, and a slag; (c) discontinuing rotation of the reactor, thereby allowing the high-grade matte to separate from the slag, whereby a matte phase and a slag phase are produced from the original charge; (d) recovering the high-grade matte phase from the reactor; (e) subjecting the molten slag phase that remains after the high-grade matte phase has been separated therefrom to vigorous agitation by again rotating the reactor at a speed of at least about 10 rpm; (f) adding an iron sulfide to the molten slag in the reactor, to provide a low-grade copper matte containing from about 20% to about 35% copper and a slag containing from about 0.3% to 0.5% copper, said low-grade matte and slag being intimately mixed by vigorous agitation as the reactor rotates, thereby extracting copper values from the slag; (g) again discontinuing rotation of the reactor, thereby allowing the low-grade copper matte to settle and to separate from the slag, whereby a matte phase are produced from the slag phase of step (c); (h) removing the slag phase of step (g) from the reactor, leaving the low-grade copper matte phase in the reactor; (i) introducing an additional charge of the molten slag into the reactor for mixing with the low-grade copper matte remaining therein from step (h); and repeating steps (a) through (i) on a cyclic basis.

4,032,328

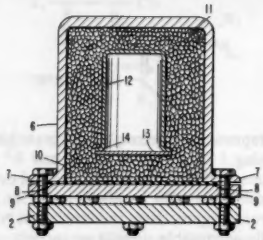
METAL REDUCTION PROCESS

Frank W. Hurd, Northfield, Minn., assignor to University of Minnesota, Inc., Minneapolis, Minn.

Filed Oct. 23, 1975, Ser. No. 625,352

Int. Cl.² G22B *5/00*; C22B *53/00*

U.S. Cl. 75—84.1 R **12 Claims**



1. A reduction process for the production of a product metal, which includes the step of reacting a reducible metal compound and a reducing metal in a sealed preformed beneficial metal container contained in a sealed outer reaction vessel and spaced from and insulated from the walls of said reaction vessel by means of a relatively inert insulating material, said beneficial metal container comprising the product metal or a metal which forms a useful alloy with said product metal.

4,032,329

METAL REDUCTION PROCESS EMPLOYING METAL SUB-HALIDES

Frank W. Hurd, Minneapolis, Minn., assignor to University of Minnesota, Inc., Minneapolis, Minn.

Filed Feb. 20, 1976, Ser. No. 659,812

Int. Cl.² C22B *34/10*

U.S. Cl. 75—84.5 **13 Claims**

1. A reduction process for the production of a product metal selected from the group consisting of titanium, zirco-

nium, tungsten, chromium, hafnium, plutonium and uranium from a sub-halide of said product metal, which includes the step of reacting the product metal sub-halide with an alkali metal reducing metal in a manner such that the temperature of the reaction mixture reaches at least about 975° C, while insulating the reaction mixture from contact with an outer reaction vessel by means of a relatively inert insulating material having a melting point above about the melting point of the reducing metal halide formed in the reduction reaction.

13. A reduction process for the production of a product metal selected from the group consisting of titanium, zirconium, tungsten, chromium, hafnium, plutonium and uranium from a sub-halide of said product metal, which includes the step of reacting the product metal sub-halide with an alkali metal reducing metal in an inner reaction container in a manner such that the temperature of the reaction mixture reaches at least about 975° C, while insulating the inner reaction container from contact with an outer reaction vessel by means of a relatively inert insulating material having a melting point at or above about the melting point of the reducing metal halide formed in the reduction reaction.

4,032,330
PROCESS FOR RECOVERY OF COPPER

Gerald F. Fountain; Jaime Veloz; Harry R. Dahlberg, and Edward A. Bilson, all of Inspiration, Ariz., assignors to Inspiration Consolidated Copper Company, Morristown, N.J.

Filed June 30, 1976, Ser. No. 701,170
Int. Cl.² C22B *15/08*
U.S. Cl. 75—101 R 4 Claims

1. A process for the leaching and recovery of copper values from copper-containing material which comprises:

vat leaching sulfidic copper ore with an aqueous acidic ferric sulfate leach solution containing at least 10 gpl ferric ion to form a copper-pregnant leach solution containing substantially less than 10 gpl ferric ion and a corresponding increase in ferrous ion concentration,

extracting said leach solution with an extractant selective to copper and non-selective to iron to strip the copper values from said leach solution,

adjusting the acid content of the stripped leach solution to about 10 to 20 gpl,

passing said acidic stripped leach solution through at least one mineral dump containing oxidized copper for a time sufficient to cause reoxidation of ferrous ion to restore the concentration of ferric ion to at least about 10 gpl,

adding sufficient sulfuric acid to the dump off-solution to cause said solution to have an acid concentration of from about 10 to about 20 gpl, and

recycling said acidic ferric sulfate leach solution to the vat leaching operation.

4,032,331
PROCESS FOR CONSERVING QUINOLIC COMPOUNDS IN AN ORGANIC EXTRACTANT COPPER RECOVERY SYSTEM

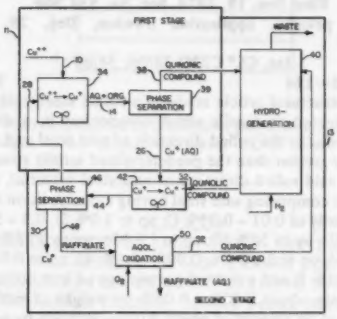
John N. Gerlach, Burlington, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.

Filed Sept. 3, 1976, Ser. No. 720,416
Int. Cl.² C22B *15/12*
U.S. Cl. 75—108 25 Claims

1. A process for producing metallic coppr from an aqueous copper solution, said process being characterized by the steps of contacting said aqueous solution with a quinolic compound to precipitate metallic copper, said quinolic compound being dissolved in a substantially water immiscible solvent capable of also dissolving the quinonic compound which forms during the reactions, and separating metallic copper from the reaction system, wherein the improvement comprises:

a. oxidizing the water solubilized unreacted quinolic compound which becomes dissolved in the aqueous solution after the precipitation of copper metal to form a water insoluble quinonic compound;

b. recovering the quinonic compound produced in step (a); and

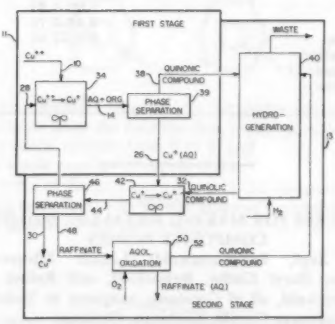


c. reducing the quinonic compound produced in step (b) to the quinonic compound for reuse in the water immiscible solvent.

4,032,332
PROCESS FOR INCREASING THE RATE OF COPPER METAL PRODUCTION IN A QUINOLIC EXTRACTION SYSTEM

John N. Gerlach, Burlington, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.

Filed Sept. 3, 1976, Ser. No. 720,415
Int. Cl.² C22B *15/12*
U.S. Cl. 75—108 26 Claims



1. A process for producing metallic copper from an aqueous copper solution, said process being characterized by the steps of contacting said aqueous solution with a quinolic compound to precipitate metallic copper, said quinolic compound being dissolved in a substantially water immiscible solvent capable of also dissolving the quinonic compound which forms during the reactions, and separating metallic copper from the reaction system, wherein the improvement comprises adding an amount of an ion selected from the group consisting of chloride ions, bromide ions, thiocyanate ions, and mixtures thereof, to said aqueous copper solution in amounts which are effective to increase the rate of copper precipitation.

4,032,333

ROLLED STEEL MATERIALS

Erik Anders Ake Josefsson, Borlange, Sweden, assignor to Stora Kopparbergs Bergslags Aktiebolag, Falun and Granges Aktiebolag, Stockholm, both of Sweden

Filed Dec. 19, 1974, Ser. No. 534,300

Claims priority, application Sweden, Dec. 28, 1973, 7317600

Int. Cl.² C22C *38/06, 38/60*

U.S. Cl. 75—124 1 Claim

1. In a structural article made of a rolled steel, said article being subjected to tensile stress component in a direction perpendicular to the rolled direction of said steel and at least equal to or greater than the predetermined tensile stress component in said rolled direction of said steel material, the improvement comprising said steel having a composition consisting essentially of 0.01 – 0.35% C, up to 1.0% Si, 0.3 – 5% Mn, up to 3% Cr, up to 10% Ni, up to 1% Mo, up to 0.15% Nb, up to 0.15% V, up to 0.6% Cu, 0.005 – 0.1% Al, up to 0.030% N, up to 0.006% B and a normal percentage of iron contaminating elements, about 0.002 – 0.05% by weight of sulfur, and tellurium, in an amount of about 0.002 – 0.009% by weight + about 0.1 times the sulphur content in percent by weight, an amount of silicate bound oxygen in said steel not exceeding about 300 parts per million, and balance iron.

4,032,334

TAPPET METALLURGY

Wayne E. Burk, La Grange, and William B. Hamilton, Batavia, both of Ill., assignors to Stanadyne, Inc., Windsor, Conn.

Filed May 10, 1976, Ser. No. 685,091

Int. Cl.² C22C *38/07*

U.S. Cl. 75—128 C 4 Claims

1. An internal combustion engine component comprising a body having at least a wearing surface formed of chilled high strength alloy cast iron consisting essentially of the following composition:

Element	Percent by Weight
Carbon	3.20–3.70
Silicon	2.00–2.90
Manganese	0.60–1.00
Chromium	1.00–1.80
Nickel	0.40–0.70
Molybdenum	0.80–2.60
Iron (plus minor sulphur, copper & phosphorus elements)	Balance

4,032,335

PROCESS FOR MAKING METALLIC, MOLDED COMPOSITE BODIES

Gerhard Zapf, Radevormwald; Lothar Albano-Müller, Schwelm; Horst Kiethe, Remscheid, and Rainer Röhlig, Radevormwald, all of Germany, assignors to Sintermetallwerk Krebsoege GmbH, Krebsoge, Germany

Filed Nov. 21, 1975, Ser. No. 634,009

Claims priority, application Germany, Dec. 19, 1974, 2460013

Int. Cl.² B22F *3/16;* F42B *13/48*

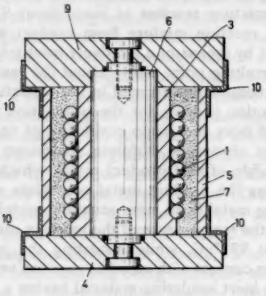
U.S. Cl. 75—208 R 8 Claims

1. A process for making molded bodies comprising discrete particles incorporated in a metallic embedding material which comprises:

fixedly positioning said discrete particles to a metallic substrate;

enveloping said discrete particles in a metal powder thereby providing a metallic sheath for said particles;

thereafter isostatically compressing said substrate, together with said metal powder sheath and said discrete particles to produce a molded body; and



sintering said molded body after it has been produced by isostatic compression.

4,032,336

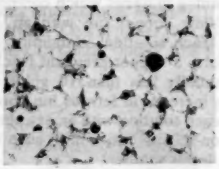
SINTERED LIQUID PHASE STAINLESS STEEL

Orville Reen, Lower Burrell, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 542,986, Jan. 22, 1975, Pat. No. 3,980,444. This application June 25, 1976, Ser. No. 699,826

Int. Cl.² B22F *1/00*

U.S. Cl. 75—224 6 Claims



1. A method of making sintered stainless steel having an overall density of at least 98% of full density and a morphology comprised of regions of sintered austenitic stainless steel and regions of solidified liquid phase, which comprises the steps of: subjecting pre-alloyed stainless steel powder consisting essentially of, by weight, up to 0.05% carbon, 22 to 26% chromium, 10 to 24% nickel, 2.7 to 5% molybdenum, 0.1 to 1% boron, up to 2.0% manganese, up to 2.0% silicon, balance iron and residuals, to at least one pressing; and sintering said pressed compact in a substantially non-oxidizing atmosphere at a temperature of from 2250° to 2375° F.

4,032,337

METHOD AND APPARATUS FOR PRESSURIZING HOT-ISOSTATIC PRESSURE VESSELS

Charles B. Boyer, Mount Lebanon, Pa., assignor to Crucible Inc., Pittsburgh, Pa.

Filed July 27, 1976, Ser. No. 709,062

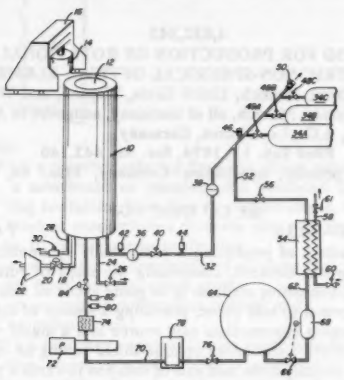
Int. Cl.² B22F *3/00*

U.S. Cl. 75—226 14 Claims

1. In a method for hot-isostatic compacting wherein a gas-pressure vessel is heated and pressurized to levels sufficient for said compacting including the steps of pressurizing said autoclave by the introduction thereto of argon gas to achieve said compacting and exhausting said argon gas from said vessel after compacting, the improvement comprising collecting and storing at least a portion of said argon gas exhausted from said vessel, cooling a portion of said collected and stored argon gas to liquefy said gas to produce liquid argon, pumping

said liquid argon to increase the pressure level thereof, and vaporizing said pumped liquid argon to produce argon gas at a further increased pressure level sufficient for said introduction to said vessel to achieve said hot-isostatic compacting.

9. In a method for hot-isostatic compacting wherein a gas-pressure vessel is heated and pressurized to levels sufficient for said compacting including the steps of pressurizing said autoclave by the introduction thereto of argon gas to achieve said compacting and exhausting said gas from said vessel after compacting, the improvement comprising collecting and storing at least a portion of said argon gas exhausted from said vessel, cooling a portion of said collected and stored argon gas by heat exchange with liquid nitrogen to liquefy said argon gas to produce liquid argon, storing said liquid argon, pumping said liquid argon to increase the pressure level thereof, vaporizing a portion of said pumped liquid argon to produce argon gas at a further increased pressure level sufficient for said



introduction to said vessel to achieve said hot-isostatic compacting.

10. In a gas pressure apparatus for hot-isostatic compacting including a high-pressure working chamber adapted to support therein a workpiece for hot-isostatic compacting, means for selectively opening and sealing said chamber for loading and removal of said workpiece, means for heating a workpiece within said chamber, means for introducing argon gas to said chamber and means for exhausting argon gas from said chamber, the improvement comprising means for collecting and storing argon gas exhausted from said working chamber, means for cooling and thereby liquefying argon gas from said collecting and storing means to produce liquid argon, means for increasing the pressure of said liquid argon, means for vaporizing said liquid argon to produce argon gas at a pressure sufficient for hot isostatic compacting of a workpiece within said chamber upon introduction of said gas thereto.

4,032,338

HOLOGRAPHIC RECORDING MEDIUM EMPLOYING A PHOTOCONDUCTIVE LAYER AND A LOW MOLECULAR WEIGHT MICROCRYSTALLINE POLYMERIC LAYER

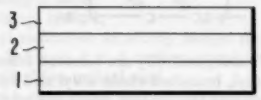
Robert Allen Gange, Belle Mead, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 515,434, Oct. 16, 1974, abandoned, which is a continuation of Ser. No. 309,754, Nov. 27, 1972, abandoned. This application Oct. 8, 1975, Ser. No. 620,749

Int. Cl.² G03G *5/022, 16/00*

U.S. Cl. 96—1.5 **3 Claims**

1. In a medium for recording and erasing phase holograms in the form of a surface relief pattern consisting essentially of in sequence an electrically conductive substrate, a photoconductive insulating layer and an electrically alterable storage layer, the improvement which comprises employing as the electrically alterable layer a layer consisting essentially of a



linear, microcrystalline hydrocarbon polymer having a molecular weight in the range from about 300 to about 2000.

4,032,339

PHOTOSENSITIVE COMPOSITION CONTAINING VANADYL PHTHALOCYANINE FOR PHOTOELECTROPHORETIC IMAGING SYSTEMS

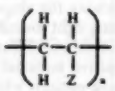
Bernard Grushkin, Pittsford; Edward Forest, Rochester, and Leonard M. Carreira, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 24, 1976, Ser. No. 689,713

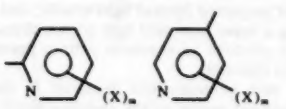
Int. Cl.² G03G *5/06*

U.S. Cl. 96—1.5 **6 Claims**

1. A composition comprising an insulating carrier liquid having dispersed therein from about 0.1 to about 10 weight percent photoelectrically active vanadyl phthalocyanine pigment and, based upon vanadyl phthalocyanine pigment concentration, about 1 to about 20 weight percent polymer comprising structural units of the formula



wherein Z is a pendant group of the formula



X is a substituent substantially incapable of withdrawing electrons from the electron rich pyridinyl moiety;

m is a whole number from 0 to 3; and

n is a whole number in excess of 25.

at least some of the polymer present in the composition being intimately associated with at least some of the phthalocyanine pigment present in the composition.

4,032,340

METHOD OF IMPROVING THE SENSITIVITY OF ORGANIC VOLUME PHASE HOLOGRAPHIC RECORDING MEDIA

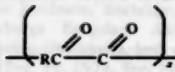
Allen Bloom, East Windsor; Robert Alfred Bartolini, Trenton, and Herbert Alfred Weakliem, Pennington, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 10, 1975, Ser. No. 566,705

Int. Cl.² G03C *5/04, 1/158*

U.S. Cl. 96—27 H **4 Claims**

1. A method of increasing the sensitivity of an organic volume phase holographic recording medium comprising a cured, transparent acrylic polyester polymer containing a soluble α-diketone which is capable of hydrogen atom abstraction with the polyester polymer and has the formula



wherein R and R′ independently are selected from the group consisting of methyl, branched-chain alkyl and cyclic hydrocarbon groups wherein the carbon atoms are part of an aromatic or aliphatic ring, and R and R′ together can form part of an aromatic or aliphatic ring and *x* is an integer of 1 or 2, said α-diketone being present in an amount sufficient to cause a permanent change in the index of refraction of the medium when illuminated by a spatially modulated coherent light beam having a wavelength corresponding to the absorption band wavelength tail of the α-diketone which comprises:

heating the recording medium to an elevated temperature from about 40° C. upwards during or following the recording to increase the sensitivity.

4,032,341

PATTERN EXPOSURE USING A POLYCHROMATIC LIGHT SOURCE

Katsumi Momose, 555, Nagata-cho, Minami, Yokohama, Kanagawa, and Kazuhisa Okutsu, 2441, Totsuka-cho, Yokohama, Kanagawa, both of Japan

Continuation of Ser. No. 429,904, Jan. 2, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,561

Claims priority, application Japan, Jan. 16, 1973, 48-7207

Int. Cl.² G03C *5/04, 5/00*

U.S. Cl. 96—27 E **7 Claims**

1. An exposure method for exposing a pattern onto a layer of photosensitive material formed on a substrate having a reflective surface, comprising the steps of:

providing an illuminating light source means projecting light having beam components of different wavelength;

placing said photosensitive material layer in a position for receiving an exposure pattern while said layer is spaced from said substrate by an intermediate layer of a light-transmitting material having substantially the same index of refraction as said photosensitive layer and having a thickness of the order of magnitude of the wavelength of the light projected by said light source, and

projecting a beam from said light source through a pattern mask to produce an exposure pattern upon said photosensitive material,

whereby said photosensitive material is disposed in a smoothed-out region of the standing wave pattern produced by light respectively incident on and reflected from said reflective surface of said substrate and is pattern-exposed with a substantially uniform sensitizing energy.

4,032,342

METHOD OF MANUFACTURING A CATHODE RAY TUBE FOR DISPLAYING COLORED PICTURES AND CATHODE RAY TUBE MANUFACTURED ACCORDING TO SAID METHOD

Francis Bernardus Strik, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 24, 1976, Ser. No. 717,195

Claims priority, application Netherlands, Sept. 1, 1975, 7510272

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36.1 **2 Claims**

1. A method of manufacturing a cathode ray tube for displaying coloured pictures and comprising a display screen having a large number of triplets each consisting of three linear areas luminescing in a first, a second and a third colour, respectively, said second colour being present between the first and the third colour, means to generate three electron beams, and a colour selection electrode comprising a large number of substantially parallel slots for assigning each electron beam to luminescent areas of one colour, in which method for providing the luminescent regions of each colour a photosensitive layer is exposed through the colour selection electrode from at least two positions present one on each side of an exposure centre for said colour in such manner that the light beams which pass through two adjacent slots overlap each other on the photosensitive layer and an unexposed area where the luminescent areas of the said colour are provided is formed on the photosensitive layer between the light beams which pass through the same slot, characterized in that during the exposure for providing the luminescent areas of the third colour at the edge of the display screen the photosensitive layer is also exposed from substantially the exposure centre for the first colour and that during the exposure for providing the luminescent areas of the first colour at the edge of the display screen, the photosensitive layer is also exposed from substantially the exposure centre for the third colour.

4,032,343

METHOD FOR PRODUCTION OF ROTATIONALLY SYMMETRIC NON-SPHERICAL OPTICAL ELEMENTS

Reinhold Deml, Munich; Ulrich Greis, Weyarn, and Wilhelm Kapfhammer, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Feb. 13, 1974, Ser. No. 442,140

Claims priority, application Germany, Mar. 14, 1973, 2307158

Int. Cl.² G03C *5/00*

U.S. Cl. 96—38.3 **7 Claims**

1. A method of producing a rotationally symmetric non-sherical optical element, comprising the steps of rotating a planar, light-sensitive medium in its plane about an axis which extends normal to said plane; providing a source of coherent light; disposing intermediate said source and a major surface of said medium a stationary opaque shield having an opening extending radially from said axis of rotation towards a periphery of said major surface; and directing at least two beams of light from said source towards said surface in such a manner that said beams intersect and form an interference pattern, portions of said pattern being intercepted by said shield and the remaining portion exposing said medium in form of a rotationally symmetric two-dimensional pattern.

4,032,344

POLYSULFONAMIDE VESICULAR BINDERS AND PROCESSES OF FORMING VESICULAR IMAGES

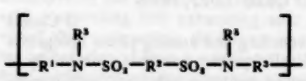
George L. Fletcher, Jr., Pittsford; Stewart H. Merrill, and Carl Kotlarchik, Jr., both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 541,676, Jan. 16, 1975, abandoned. This application Dec. 29, 1975, Ser. No. 645,178

Int. Cl.² G03C *5/24*

U.S. Cl. 96—48 HD **19 Claims**

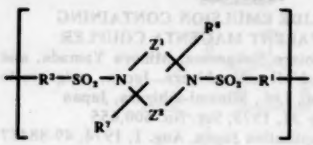
1. In an imaging element comprising: I) a support, and on the support an admixture of II) a waterinsoluble, thermoplastic, polymeric binder having a permeability constant for gas ranging from about 1×10^{-11} to about 1×10^{-15}, and III) a radiation-decomposable vesiculating agent capable of generating a gas upon imagewise exposure; the improvement wherein the binder is a sulfonamide polymer having in the backbone or pendant therefrom, the moiety $-SO_2-N<$, said polymer having a λmax no greater than about 350 nm in the spectral range of 200 to 750 nm, and at least one repeating unit selected from the group consisting of:



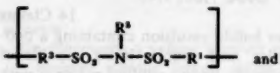
(a)

(b)

-continued



(c)



and

(d)

wherein:

A. R^1 is a member selected from the group consisting of:
1. a substituted or unsubstituted saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms in the ring;
2. a substituted or unsubstituted alkylene radical containing from 1 to 10 carbon atoms;
3. an oxycarbonylphenylene radical; and
4. an imino radical;

B. R^2 is a saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms;

C. R^3 is a member selected from the group consisting of:
1. an alkyleneoxycarbonylphenylene radical wherein the number of carbon atoms in the alkylene function is from 1 to 5;
2. a carbonylimino radical;
3. in formula (a) only, a nitrogen-carbon bond when R^1 is other than an oxycarbonylphenylene or an imino radical; and
4. an α-iminocarbonyl -carbonylalkylene radical when R^1 is an imino radical and R^1 and R^3 are each connected to a nitrogen atom;

D. Z^1 and Z^2 are the same or different, and are each the atoms necessary to complete a heterocyclic group;

E. R^6 and R^7 are the same or different and can be a hydrogen atom or a methyl radical joined to one of the carbon atoms of Z^1 or Z^2;

F. R^4 is an alkylene radical containing from 1 to 5 carbon atoms or an isophthalate or terephthalate radical;

G. R^5 is methyl or a hydrogen atom;

H. L is a member selected from the group consisting of a carbon-nitrogen bond, a phenyl linked in the ortho or para positions, and carbonyl;

I. M is a member selected from the group consisting of $-NH_2$, an alkyl radical containing from 1 to 10 carbon atoms, and a methyl-substituted or unsubstituted aryl radical containing from 6 to 10 carbon atoms;

J. Q is an alkylene radical containing from 2 to 5 carbon atoms when R^4 is isophthalate or terephthalate and otherwise is a chemical bond; and

K. T is either 1) a substituted or unsubstituted saturated carbocyclic ring containing from 5 to 10 carbon atoms, or substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms in the ring, (2) a substituted or unsubstituted alkylene radical containing from 1 to 10 carbon atoms, or 3) a nitrogen-to-sulfur bond when M is other than $-NH_2$;

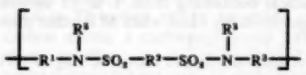
L. the substituents of said substituted aromatic ring of (A) 1), (B), and (K) being selected from the group consisting of:
1. an alkyl radical containing from 1 to 4 carbon atoms;
2. a halogen atom;
3. a phenyl radical;
4. an acyl radical or an alkoxy radical the alkyl portion of which has from 1 to 4 carbon atoms; and
5. an alkylthio radical; and

M. the substituents of said substituted alkylene radical of (A) 2) and (K) being selected from the group consisting of:
1. an alkyl radical containing from 1 to 4 carbon atoms, and
2. a phenyl radical.

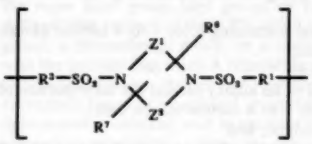
16. A dry process for forming a photographic image, comprising the steps of:

a. imagewise-exposing a radiation-sensitive photographic element containing, on a support, an admixture of a decomposable radiation-sensitive vesiculating agent capable of generating a gas upon exposure to activating radiation, and a polymeric binder having as a repeating unit one which includes the linkage $>N-SO_2-$ as a portion of the backbone of the polymer or as a pendant moiety and is selected from the group consisting of

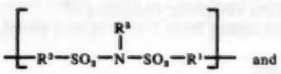
(a)



(b)



(c)



and

(d)

wherein

A. R^1 is a member selected from the group consisting of:
1. a substituted or unsubstituted saturated carbocylic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms in the ring;
2. a substituted or unsubstituted alkylene radical containing from 1 to 10 carbon atoms;
2. an oxycarbonylphenylene radical; and
4. an imino radical;

B. R^2 is a saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6 to 10 carbon atoms;

C. R^3 is a member selected from the group consisting of:
1. an alkyleneoxycarbonylphenylene radical wherein the number of carbon atoms in the alkylene function is from 1 to 5;
2. a carbonylimino radical;
3. in formula (a) only, a nitrogen-carbon bond when R^1 is

other than an oxycarbonylphenylene or an imino radical; and

4. an α-iminocarbonyl-ω-carbonylalkylene radical when R^1 is an imino radical and R^1 and R^3 are each connected to a nitrogen atom;

D. Z^1 and Z^2 are the same or different, and are each the atoms necessary to complete a heterocyclic group;

E. R^6 and R^7 are the same or different and can be a hydrogen atom or a methyl radical joined to one of the carbon atoms of Z^1 or Z^2;

F. R^4 is an alkylene radical containing from 1 to 5 carbon atoms or an isophthalate or terephthalate radical;

G. R^5 is methyl or a hydrogen atom;

H. L is a member selected from the group consisting of a carbon-nitrogen bond, a phenyl linked to the unit in the ortho positions, and carbonyl;

I. M is a member selected from the group consisting of $-NH_2$, an alkyl radical containing from 1 to 10 carbon atoms, and a methyl-substituted or unsubstituted aryl radical containing from 6 to 10 carbon atoms;

J. Q is an alkylene radical containing from 2 to 5 carbon atoms when R^4 is isophthalate or terephthalate and otherwise is a chemical bond; and

K. T is a substituted for unsubstituted saturated carbocyclic ring containing from 5 to 10 carbon atoms, or a substituted or unsubstituted aromatic ring containing from 6–10 carbon atoms in the ring; a substituted or unsubstituted alkylene radical containing from 1 to 10 carbon atoms, or a nitrogen-to-sulfur bond when M is other than $-NH_2$;

L. the substituents of said substituted aromatic ring of (A) 1), (B), and (K) being selected from the group consisting of:

1. an alkyl radical containing from 1 to 4 carbon atoms;
2. a halogen atom;
3. a phenyl radical;
4. an acyl radical or an alkoxy radical the alkyl portion of which has from 1 to 4 carbon atoms; and
5. an alkylthio radical; and

M. the substituents of said alkylene radical of (A) 2) and (K) being selected from the group consisting of:

1. an alkyl radical containing from 1 to 4 carbon atoms; and
2. a phenyl radical; and

b. developing the exposed element by heating it to a temperature and for a time sufficient to force the gas bubbles formed by the photodecomposition of the agent to expand to form a visible image.

4,032,345

SILVER HALIDE MATERIALS CONTAINING PHOTOGRAPHIC COLOR COUPLERS WITH ISOTHIOCYANATO GROUPS

Kozo Inouye; Yukio Yokota; Akio Okumura; Seiiti Kubodera, and Keisuke Shiba, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 1, 1975, Ser. No. 601,567

Claims priority, application Japan, Aug. 2, 1974, 49-88677

Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—55 **12 Claims**

10. A method of forming a color photographic image comprising developing an exposed silver halide photographic material with a developer containing an aromatic primary amine developing agent in the presence of a color coupler of the formula (I)

$$A - N = C = S \qquad (I)$$

wherein A represents an image forming coupler residue containing a naphthol nucleus, a phenol nucleus, a 5-pyrazolone nucleus, or a pyrazolobenzimidazole nucleus and the -N=C=S group is bonded to the coupling position of the nucleus.

4,032,346

SILVER HALIDE EMULSION CONTAINING TWO-EQUIVALENT MAGENTA COUPLER

Nobuo Furutachi; Kotaro Nakamura; Minoru Yamada, and Atsuaki Arai, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

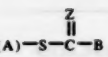
Filed July 31, 1975, Ser. No. 600,655

Claims priority, application Japan, Aug. 1, 1974, 49-88417

Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—56.5 **14 Claims**

1. A photographic silver halide emulsion containing a two-equivalent magenta coupler, said coupler being capable of forming a magenta color image upon coupling reaction with an oxidation product of an aromatic primary amine developing agent, represented by the following general formula (I)



(I)

wherein (A) represents a residue of a 5-oxo-2-pyrazoline magenta color forming coupler or a residue of a pyrazolo-[1,5-a]-benzimidazole magenta color forming coupler;

represents a group which is substituted for one hydrogen atom of the active methylene group in the coupler A; Z represents an oxygen atom or a sulfur atom; B represents a — Y group, a — D — Y group or a

group; D represents an oxygen atom or an — NR — group; R represents a hydrogen atom, an alkyl group or an aryl group; Y represents an alkyl group, an aryl group or a heterocyclic group; and Q in the

group represents the non-metallic atoms necessary to form a 5-membered or 6-membered nitrogen-containing heterocyclic ring, such atoms consisting of at least one carbon atom and of one or more nitrogen, oxygen or sulphur atoms.

4,032,347

2-EQUIVALENT ACYLACETAMIDE YELLOW FORMING COUPLERS WITH 2,6-DIOXO-7-PURINYL COUPLING OFF GROUP

Raphael Karel Van Poucke, Berchem; Marc Willem Ailliet, Kontich; Leo August Van Wijnsberghe, 's-Gravenwezel, and Gaston Jacob Benoy, Edegem, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

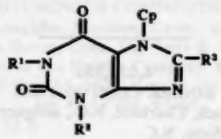
Filed Nov. 25, 1975, Ser. No. 635,064

Claims priority, application United Kingdom, Jan. 3, 1975, 314/75

Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—56.5 **15 Claims**

13. Method of producing coloured photographic images in a photographic light-sensitive silver halide material which comprises exposing the material and developing it with an aromatic primary amino colour developing agent in the presence of a 2-equivalent yellow forming ketomethylene colour coupler wherein the colour coupler carries at the active methylene group a 2,6-dioxo-7-purinyl group in its oxo- or enol form and has the formula:



wherein:

Cp represents a yellow forming open-chain acylacetamide coupler residue linked through the active methylene group,

each of R^1 and R^2, which may be the same or different, represents hydrogen, an alkyl group, or an aryl group, and

R^3 represents hydrogen, an alkyl group, an aryl group, a hydroxy group, an alkoxy group, an amino group, a mercapto group, an alkylthio group, a carboxy group, an alkoxycarbonyl group or a carbamoyl group.

4,032,348

METHOD FOR FORMING PHASE HOLOGRAMS

Keishiro Kido; Masayoshi Tsuboi, and Noboru Arai, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

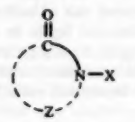
Filed Oct. 30, 1975, Ser. No. 627,316

Claims priority, application Japan, Oct. 30, 1974, 49-125036

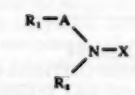
Int. Cl.² G03C 5/32, 5/04

U.S. Cl. 96—60 R **11 Claims**

1. A method for producing a phase hologram by bleaching a silver image of an amplitude hologram formed on a light sensitive silver halide photographic material, wherein said amplitude hologram is produced by exposing a light sensitive silver halide photographic material to reference and object beams of electromagnetic radiation to which the silver halide photographic is sensitive, developing the exposed material and fixing the developed material and wherein said bleaching is conducted using a bleaching solution containing one or more N-halogeno compounds represented by the following general formulae (I) and (II)



(I)



(II)

wherein X represents a halogen atom, SCN or CN; Z represents the atoms necessary for forming a five- or six-membered ring which may be condensed with another ring; A represents a carbonyl or sulfonyl group; and R_1 and R_2 represent an alkyl group, aryl group or alkoxyl group.

4,032,349

HIGH MOLECULAR WEIGHT MERCAPTO COMPOUND IN COLOR DIFFUSION TRANSFER PROCESSING COMPOSITION

Seiki Sakanoue; Motohiko Tsubota; Yoshiharu Fuseya; Keiichi Adachi, and Tadao Shishido, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 25, 1975, Ser. No. 590,523

Claims priority, application Japan, June 26, 1974, 49-72995

Int. Cl.² G03C 1/40, 7/00, 5/54

U.S. Cl. 96—77 **12 Claims**

1. A color diffusion transfer photographic material which comprises: (a) a light-sensitive element containing at least one silver halide emulsion layer having a dye image-providing material associated therewith; (b) an image-receiving element capable of imagewise fixing said dye image-providing material as a result of exposure and development of the silver halide emulsion layer; and (c) a processing composition capable of causing development of said silver halide emulsion layer and containing a mercapto compound having a molecular weight of about 230 or higher, said mercapto compound being a compound represented by the following general formula (I) or (II):

$$R^1 - SH \quad \text{(I)}$$

$$R^3 - SH \quad \text{(II)}$$

wherein R^1 represents an alkyl group having 14 to 32 carbon atoms or an aralkyl group having 15 to 32 carbon atoms, which can be substituted with a halogen atom, a nitro group, a carboxy group, a sulfo group, a cyano group, an alkoxy group, or an aryloxy group; R^2 represents a 3 - to 6 - membered carbocyclic group, a 3 - to 6-membered heterocyclic group containing at least one carbon atom and 1 to 5 atoms other than carbon atoms, or a B-A-group, and said carbocyclic group or hetero cyclic group can form a fused ring group and can be substituted with a halogen atom, a nitro group, a carboxy group, an aliphatic hydrocarbyl group having 1 to 32 carbon atoms, a monocyclic or bicyclic fused aryl group having 6 to 32 carbon atoms, an amido group having up to 32 carbon atoms, a carbamoyl group having up to 32 carbon atoms, an alkoxy group having up to 32 carbon atoms, or an aryloxy group having up to 32 carbon atoms; and, B represents the same alkyl group, aryl group, or heterocyclic group as defined with respect to R^1 to R^2; and A represents a carbonyl group, a thiocarbonyl group, or a carboxymethylene group, with the proviso that when A represents a carbonyl group or a thiocarbonyl group, B does not represent an amido group, a carbamoyl group or a carbonyl group with at least one of said light-sensitive element, said image-receiving element and said processing composition containing a developing agent for the silver halide which is a benzenoid developing agent capable of forming a quinoid structure upon being oxidized.

4,032,350

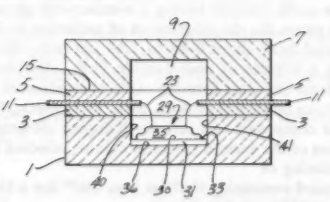
PRINTING PASTE VEHICLE, GOLD DISPENSING PASTE AND METHOD OF USING THE PASTE IN THE MANUFACTURE OF MICROELECTRONIC CIRCUITRY COMPONENTS

Bernard Greenstein, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 340,200, March 12, 1973, abandoned. This application June 12, 1975, Ser. No. 586,786

Int. Cl.² C09D 5/24

U.S. Cl. 106—1 **24 Claims**



1. In an improved gold dispensing paste composition comprising a vehicle, and a solids component including gold, the improvement wherein said paste composition comprises:

A. about 75–25% by weight of said vehicle and said vehicle comprises in weight percent about ;

1. 83–94% of an organic solvent consisting essentially of an admixture of diethylene glycol monobutyl ether

acetate and polypropylene glycol having an average molecular weight of about 400 present together in said admixture,

2. 2–3% of an organic binding agent consisting essentially of N-4 to N-200 ethyl cellulose or mixtures thereof, and

3. 6–9% of an organic thixotrope consisting essentially of hydrogenated castor oil; and

B. about 25–75% by weight of said solid component uniformly dispersed in suspension in said vehicle and said solids component possesses a specific gravity greater than the specific gravity of said fluid vehicle at temperatures in the temperature range of 40°–60°C. comprises in weight percent about;

1. 2–6% of a particulate glass binder selected from the glass composition group consisting essentially of lead-zinc borate and lead borosilicate glass compositions, and

2. 98–94% of a gold powder; and wherein said paste composition possesses a fineness of less than 20 microns and a viscosity of about 1,300,000–1,700,000 cps at about 25° C.

22. A solid particle dispensing paste composition possessing a viscosity of about 1,300,000–1,700,000 cps at about 25° C. and including:

A. about 25–75% by weight of a vehicle comprising:

1. about 83–94% by weight of an organic solvent consisting essentially of an admixture of diethyelene glycol monobutyl ether acetate and polypropylene glycol having an average molecular weight of about 400 present together in said admixture,

2. about 2–3% by weight of an organic binding agent consisting essentially of N-4 to N-200 ethylcellulose or mixtures thereof, and

3. about 6–9% by weight of an organic thixotrope consisting essentially of hydrogenated castor oil; and

B. about 25–75% by weight of solid particles possessing a specific gravity greater than the specific gravity of said vehicle at temperatures in the temperature range of 40°–60° C. and consisting essentially of:

1. powdered glass binder selected from the glass composition group consisting essentially of lead-zinc borate and lead borosilicate glass compositions, and

2. powdered noble metal.

4,032,351
RARE EARTH CERAMIC FOR FREQUENCY CONVERSION OF RADIATION

Francois F. Auzel, 39 Avenue Port Royal des Champs, 78320 Le Mesnil St. Denis, France; Denise M. Morin, 44, rue de Goulmiers, 94130 Nogent-Sur-Marne, France, and Dario C. Pecile, 17, Boulevard Andre, 93250 Villemomble, France

Continuation-in-part of Ser. No. 491,485, July 24, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 649,966

Int. Cl.² C03C *3/22*; C09K *11/08*

U.S. Cl. 106—39.6 **6 Claims**

1. A rare earth ceramic having a microcrystal phase buried in a glassy phase for the conversion of radiation in the near-infrared band from about 0.85 to 1.06 μm into visible light, comprising a mixture of lead fluoride PbF_2, ytterbium oxide Yb_2O_3, at least one glass-forming oxide of an element selected from the group consisting of B_2O_3, SiO_2, P_2O_5, GeO_2, TeO_2 and at least one compound of a rare earth doping element chosen as a function of the desired emission colour, selected from the group consisting of

a compound containing thulium ions Tm^{3+} for a blue emission mixture;

a compound containing erbium ions Er^{3+} for a green emission mixture;

a compound containing holmium ions Ho^{3+} for a green emission mixture;

a compound containing erbium ions Er^{3+} for a red emission mixture,

whereby the oxygen ions from the oxides are exclusively located in the glassy phase while ytterbium and the rare earth doping element are exclusively located in the microcrystal phase.

4,032,352
BINDER COMPOSITION

Wolfgang B. Pietsch, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Filed May 3, 1976, Ser. No. 682,418

Int. Cl.² C09J *1/02*

U.S. Cl. 106—78 **12 Claims**

1. A binder composition for mineral ores and metallized particulate material consisting essentially of

from about 2 to about 40 percent pitch,

from about 15 to about 35 percent of the group consisting of hydrated lime, moist mill scale, and mixtures thereof,

from about 15 to about 30 percent liquid sodium silicate; and up to 50 percent water

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4,032,353
LOW POROSITY AGGREGATE-CONTAINING CEMENT COMPOSITION AND PROCESS FOR PRODUCING SAME

Frank J. Ball, Charleston; David V. Braddon, Charleston Heights, and Lynden J. Stryker, Mount Pleasant, all of S.C., assignors to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 569,986, April 2, 1975, Pat. No. 3,960,582. This application May 24, 1976, Ser. No. 689,513

The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.

Int. Cl.² C04B *7/35*

U.S. Cl. 106—90 **20 Claims**

1. A low porosity, aggregate-containing cement composition comprising;

a. a hydraulic cement having a fineness above about 2,000 $cm.^2/gm.$ without gypsum,

b. alkali bicarbonate in an amount at least 0.1% by weight based on dry ground cement,

c. a lignin selected from the group consisting of alkali metal lignosulfonate, alkaline earth metal lignosulfonate, ammonium lignosulfonate, alkali metal salt of sulfonated lignin, alkaline earth metal salt of sulfonated lignin and ammonium salt of sulfonated lignin in an amount of at least 1.0% by weight based on dry ground cement, and

d. said aggregate-containing cement composition having been made at a water-to-cement ratio between 0.4 and 0.15.

4,032,354
SURFACE-COATING COMPOSITIONS CONTAINING CALCIUM SALT LOSS-OF-DRY INHIBITORS AND A METHOD OF PREPARING SAME

Irene A. E. Fraser, Toronto, Canada, assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Oct. 20, 1975, Ser. No. 623,881

Claims priority, application Canada, Nov. 25, 1974, 214559

Int. Cl.² C09D *3/26*

U.S. Cl. 106—260 **23 Claims**

1. A surface-coating composition that comprises an oxidizable, organic, film-forming resinous vehicle and from 0.5% to 5.0%, based on the weight of the vehicle, of a loss-of-dry inhibitor, said loss-of-dry inhibitor being a suspension of finely-divided calcium hydroxide in a solution containing at least one calcium salt of a monocarboxylic acid selected from the group consisting of salts of branched-chain aliphatic monocarboxylic acids having 6 to 14 carbon atoms, salts of cycloaliphatic monocarboxylic acids having 6 to 10 carbon atoms, and mixtures thereof in an inert, non-polar organic solvent, said loss-of-dry inhibitor containing from 5% to 25% by weight of finely-divided calcium hydroxide and having a total calcium content of 5% to 20% by weight.

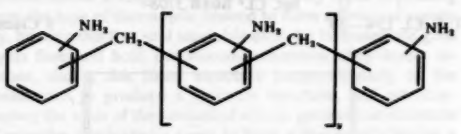
4,032,355
BITUMINOUS COMPOSITION

Alexander McLaughlin, Meriden, Conn., and Adnan A. R. Sayigh, North Haven, Conn. (by Anne B. Sayigh, conservatrix), assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Nov. 14, 1975, Ser. No. 631,823
Int. Cl.² C08L 95/00
U.S. Cl. 106—273 N 7 Claims

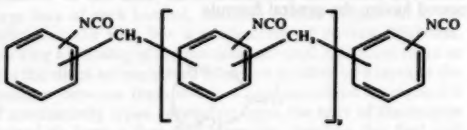
1. A bituminous composition having an elevated softening point said composition consisting essentially of the product obtained by treating bitumen, in the molten state at a temperature of from about 100° C to about 200° C and in the absence of solvent, with a combination of:

a. an amine selected from the class consisting of aliphatic monoamines having from 10 to 20 carbon atoms, inclusive, and aromatic polyamines selected from the class consisting of arylene diamines having 6 to 12 carbon atoms in the arylene radical and polyamines having the structure



wherein Y is 0 or a number having an average value from 0 to 1; and

b. an isocyanate selected from the class consisting of aliphatic monoisocyanates having from 10 to 20 carbon atoms, and aromatic polyisocyanates selected from the class consisting of arylene diisocyanates having 6 to 12 carbon atoms in the arylene radical and polyisocyanates having the structure



wherein Y is 0 or a number having an average value from 0 to 1 provided that, in any instance in which the amine component (a) is aliphatic the isocyanate component (b) is aromatic; and provided further that amine component (a) is employed in an amount within the range of 0.25 to 3.0 equivalents per equivalent of the isocyanate component (b) and the total weight of amine component (a) plus isocyanate component (b) is from about 1 to about 10 weight percent of said bitumen.

4,032,356
COMPOSITION FOR PREVENTING ADHESION OF DAMP EARTH ON METAL SURFACES

Ruscho Panayotov Hadjiliiev; Maria Ivanova Todorova, both of Stara Zagora; Tzvetan Obretenov Georgiev, Sofia; Kubrat Vassilev Naydenov, Stara Zagora; Dinko Mihaylov Jechev, Village Konyovo, beside Sliven; Yanka Bogdanova Staneva, and Irina Valcheva Hadjiilieva, both of Stara Zagora, all of Bulgaria, assignors to Mnipki "Minprojekt", Sofia, Bulgaria

Filed Nov. 24, 1975, Ser. No. 634,538
Int. Cl.² C07G 17/00; C09K 3/00
U.S. Cl. 106—287 R 3 Claims

1. A new composition of matter for preventing the adhesion of ore-containing earth on metal surfaces of ore transport carriages for mining applications, consisting of 80–85% by weight of at least one resinous oleous liquid having a boiling point in the range of 140°–160° C, a freezing point of about −20° C, and a specific weight of 0.95–1.00, the liquid being formed as a by-product of the generation of cyclohexanon from phenol during the manufacture of caprolactam, and the remainder by weight of a substance selected from the group consisting of at least one heavy xylene fraction and at least one condensed, highly aromatic oil produced as a by-product of oil refining.

4,032,357
EASY DISPERSING ALKALI BLUE POWDER AND PROCESS FOR MANUFACTURE

Thomas C. Rees, Park Forest South, and Robert J. Flores, Alsip, both of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Mar. 3, 1976, Ser. No. 663,600
Int. Cl.² C08K 5/17
U.S. Cl. 106—288 Q 17 Claims

1. A substantially anhydrous, free-flowing alkali blue pigmentary composition, the pigmentary particles thereof coprecipitated with at least one aqueous alkaline soluble organic dispersant of the anionic class, said coprecipitated dispersant containing at least eight carbon atoms and insoluble in water, said coprecipitated pigmentary particles and dispersant combination further admixed with a water-insoluble organic hydrophobic oil phase of a quantity sufficient to substantially reduce hydrophilic aggregation of said coprecipitate during drying by water removal.

4,032,358
PRODUCING GLASS FIBER CONTAINING EPOXY RESIN ADHESIVE FILMS

Amir Hussain, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 22, 1976, Ser. No. 725,538
Claims priority, application Germany, Oct. 8, 1975, 2545149
Int. Cl.² C08K 5/07
U.S. Cl. 106—311 4 Claims

1. In an improved method for the production of glass fiber epoxy resin adhesive films, the step of dissolving the hardener dicyandiamide in a solvent comprised of diacetone alcohol and water.

4,032,359
REMOVAL OF ALUMINIUM RICH COATINGS FROM HEAT RESISTING ALLOYS

Maurice Fisher; Michael Kruger, and Terence Walter Maber, all of Bristol, England, assignors to Rolls-Royce (1971) Limited, Great Britain

Filed Aug. 4, 1975, Ser. No. 601,930
Claims priority, application United Kingdom, Aug. 8, 1974, 34760/74
Int. Cl.² C23F 1/00; C23G 1/02
U.S. Cl. 134—3 5 Claims

1. A method of removing an aluminide coating from a component made of a material based on an element selected from the group consisting of nickel and cobalt, comprising the step of

immersing said component in a solution consisting essentially of, by volume:

Nitric Acid	50–70% (Sp. Gr. 1.42)
Sulfuric Acid	25–50% (Sp. Gr. 1.84)
Water	Remainder (if any).

5. The method of claim 1 comprising the further step of removing said component from said solution after a predetermined time, and

immersing said component in a further solution consisting essentially of, by volume:

Ferric Chloride Solution	75–90% (Sp. Gr. 1.3)
Sulfuric Acid	5–20% (Sp. Gr. 1.84)
Hydrofluoric Acid	3–7% (60% w/w).

4,032,360
METHOD OF REMOVING IRON SULFIDE AND SLUDGE FROM METAL SURFACES

Thomas L. Sharp, 715 Nenana St., Houston, Tex. 77035

Division of Ser. No. 508,674, Sept. 23, 1974, Pat. No. 4,003,856. This application Mar. 17, 1976, Ser. No. 667,626
Int. Cl.² B08B *3/08*
U.S. Cl. 134—3 **2 Claims**

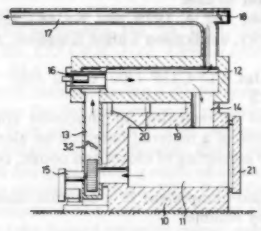
1. A method of removing iron sulfide and sludge from interior surfaces in an oil system which comprises adding to the effluent of the oil system for onstream treatment an effective iron sulfide and sludge removing amount of a composition comprising:

a. from about two to about fifteen percent by weight of a high molecular weight linear diamine derived from a higher fatty acid containing from 12 to 30 carbon atoms;
b. from about three to about twenty percent by weight of acetic acid;
c. from about 20 to about 50 percent by weight of a low molecular weight ketone ether solvent containing from four to eight carbon atoms;
d. from about 1 to about 15 percent by weight of an alcohol solvent selected from aliphatic alcohols containing up to six carbon atoms and diacetone alcohol; and
e. from about 20 to about 50 percent by weight of a heavy aromatic naphtha solvent having a specific gravity of 0.885 to 0.970 and a boiling point within the range of 160°–220° C.

4,032,361
METHOD AND APPARATUS FOR CONTROLLED SEPARATION OF SUBSTANCES BY HEATING

Hans Georg Eriksson; Karl Gösta Sjöberg, both of Finspang, and Karl Börje Löfgren, Vasteras, all of Sweden, assignors to Granges Essem Aktiebolag, Vasteras, Sweden

Filed Mar. 24, 1976, Ser. No. 670,171
Claims priority, application Sweden, Mar. 25, 1975, 7503476
Int. Cl.² B08B *5/00*
U.S. Cl. 134—19 **14 Claims**



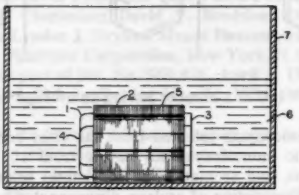
1. Method for controlled separation of substances by heating, including the steps of:

a. introducing a material from which one or more substances are to be separated into a closed oven chamber;
b. introducing into the oven chamber a gas which has been heated to a temperature sufficient to evaporate one or more of the substances to be separated, and containing insufficient oxygen to permit substantial burning in the oven chamber;
c. extracting the heated gas together with the evaporated substances from the oven chamber to create a depressed pressure in the oven chamber;
d. forcing the extracted gas to a combustion chamber;
a. burning the evaporated substance in the combustion chamber;
f. recirculating a portion of the gas passing through the combustion chamber to the oven chamber as the gas introduced in step (b) and back to the combustion chamber in accordance with step (d), for continuous heating; and
g. diverting a portion of the gas from the combustion chamber to the atmosphere.

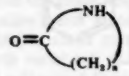
4,032,362
METHOD OF STRIPPING THERMOSET POLYMERS WITH MOLTEN LACTAMS

Leonard E. Edelman, Penn Hills, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 23, 1975, Ser. No. 643,720
Int. Cl.² B08B *3/08*
U.S. Cl. 134—38 **9 Claims**



1. A method of removing a thermoset polymer deposited on an article comprising immersing the article in a molten compound having the general formula

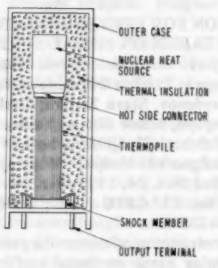


where *n* is an integer from 5 to 7.

4,032,363
LOW POWER HIGH VOLTAGE THERMOPILE

Valvo Raag, Mountain View, Calif., assignor to Syncal Corporation, Sunnyvale, Calif.

Filed Jan. 27, 1975, Ser. No. 544,363
Int. Cl.² H01V *1/30*
U.S. Cl. 136—211 **14 Claims**



1. A method of manufacturing a thermopile using silicon-germanium alloys comprising the steps of sawing n- and p-type silicon-germanium alloy materials into parallelepipeds, cutting the n- and p-type silicon-germanium alloy parallelepipeds into

slices, surface finishing both large faces of each slice so that both of the large faces of each slice are parallel to each other, cleaning the slices, coating at least one large face of each slice with a glass powder, the glass having a softening point above the intended operational temperature of the thermopile, a high resistivity, and a linear thermal expansion coefficient which approximately matches that of the silicon-germanium alloy, sintering each glass-coated slice at a temperature close to the softening temperature of the glass to locally bond the glass powder particles to each other and to the slice, stacking each glass-coated slice with another slice so that a glass layer occurs between the two silicon-germanium alloy slices to form a sandwich stack, heating each sandwich stack to a temperature at which the glass bonds the two slices together with an intermediate glass layer, surface finishing at least one of the outer, large faces of each heat-bonded sandwich stack down to the point that the total sandwich stack has a predetermined desired thickness, covering at least one face of each surface-finished sandwich stack with glass powder, stacking a plurality of the glass powder-covered individual sandwich stacks in a predetermined arrangement of conductivity types depending upon the type of thermopile desired to form a first seal assembly, heating this first seal assembly until the intermediate glass layers fuse and hold the silicon-germanium alloy layers together, slicing this fused structure perpendicularly to the laminations to produce a laminate structure, and interconnecting the ends of the laminated silicon-germanium elements of opposite conductivity types to form a thermopile having a predetermined voltage and power output.

14. A method of manufacturing a thermopile using silicon-germanium aloys comprising the steps of sawing n- and p-type silicon-germanium alloy material into parallelepipeds, cutting the n- and p-type silicon-germanium alloy parallelepipeds into slices, surface finishing both large faces of each slice so that both of the large faces of each slice are parallel to each other, cleaning the slices, coating one large face of each slice with an insulator, the insulator having a high resistivity, bonding the insulator to the slice, surface finishing the outer, uncoated large face of each bonded, insulator coated slice down to the point that the slice has a predetermined desired thickness, stacking a plurality of the insulator covered individual slices so that the slices are separated from one another by a layer of the insulator between them and in a predetermined arrangement of conductivity types depending upon the type of thermopile desired to form a first seal assembly, bonding this first seal assembly so that the intermediate insulator layers hold the silicon-germanium alloy layers together, and interconnecting the ends of at least a portion of the laminated silicon-germanium elements of opposite conductivity types to form a thermopile having a predetermined voltage and power output.

4,032,364

DEEP DIODE SILICON CONTROLLED RECTIFIER

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 554,172, Feb. 28, 1975, Pat. No. 3,988,768, which is a continuation of Ser. No. 411,004, Oct. 30, 1973, abandoned. This application May 3, 1976, Ser. No. 682,499

Int. Cl.² H01L *21/225*

U.S. Cl. 148—1.5 **37 Claims**

1. A process for making a semiconductor device comprising

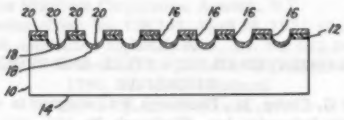
a. selecting a body of semiconductor material having a predetermined level of resistivity, a predetermined type conductivity and two major opposed surfaces which are, respectively, the top and bottom surfaces thereof, at least one of the major surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (100), (110), and (111), and a vertical axis of the body being substantially aligned parallel with a first axis of the crystal structure which is substantially perpendicular to at least the major surface having the preferred planar orientation;

b. vapor depositing a first array of metal wires having a selected configuration on the major surface of the body having a preferred crystal planar orientation, the metal comprising at least one material suitable for imparting to a portion of the body a predetermined type conductivity and a predetermined level of resistivity, each wire being oriented substantially parallel with a preferred second crystal axis of the material of the body;

c. heating the body and the array of metal wires to a predetermined elevated temperature sufficient to form an array of liquid wires of metal-rich semiconductor material on the surface of the body;

d. establishing a temperature gradient in the body substantially perpendicular to the two opposed major surfaces, the major surface having the array of liquid wires being at the lower temperature;

e. migrating the first array of metal wires by thermal gradient zone melting entirely through the body from the major surface of lower temperature to the major surface of higher temperature substantially parallel with the first crystal axis to form a lamellar body of semiconductor material of at least one group of two integral pairs of first and second regions of alternate and opposite type conductivity and to form a P-N junction between each mutual pair of regions of opposite type conductivity, the first region of one pair and the second region of the second pair each having a surface area comprising, respectively, one of the two major opposed surfaces of the body, the first and third regions of each group having a first type conductivity and the second and fourth regions of each group having a second, and opposite, type conductivity;



f. affixing a first electrical contact to a surface area of the first region of the group;

g. affixing a second electrical contact to a surface area of the fourth region of the group, and

h. affixing a third electrical contact to a surface area of one of the second and third regions of the group.

4,032,365

WARM FORM COOLING AND HEAT RECOVERY TUNNEL

Francis H. Brickmont, Pittsburgh, Pa., assignor to Caterpillar Tractor Co., Peoria, Ill.

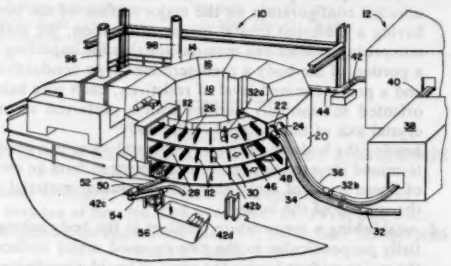
Filed May 5, 1976, Ser. No. 683,434

Int. Cl.² C21D *1/34, 7/13*

U.S. Cl. 148—12 R **9 Claims**

1. A method of controlling the temperature of a warm-formed workpiece formed by warm forming a slug at an initial preheat temperature to a workpiece form at a higher post-form temperature comprising transferring heat from said

workpiece to said slug, thereby cooling said workpiece and heating said slug so that the heat energy generated in the



warm-forming operation is effectively conserved and is used to preheat said slug.

4,032,366

GRAIN-ORIENTED SILICON STEEL AND PROCESSING THEREFOR

Edward G. Choby, Jr., Pittsburgh, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed May 23, 1975, Ser. No. 580,449
Int. Cl.² C22B *33/00*; H01F *1/04*
U.S. Cl. 148—31.5 7 Claims

1. As an article of manufacture, grain-oriented silicon steel having a cube-on-edge orientation and a cured coating thereon, said coating having been essentially of from 4 to 30% phosphate ion, 0.3 to 6% magesium ion, 5 to 34% colloidial silica, 0.15 to 6% hexavalent chromium, balance water; said cured coating placing said steel in tension, said tension being at least 800 psi.

4,032,367

CORROSION RESISTANT STEELS

William Henry Richardson, Datchet, and Prodyot Guha, High Wycombe, both of England, assignors to Langley Alloys Limited, Slough, England

Continuation-in-part of Ser. No. 625,849, Oct. 28, 1975, abandoned. This application Oct. 8, 1976, Ser. No. 730,936
Claims priority, application United Kingdom, Oct. 28, 1974, 46430/74
Int. Cl.² C22C *38/42*
U.S. Cl. 148—38 1 Claim

1. A corrosion resistant high strength steel, which has a ferritic/austenitic microstructure consisting of 40 to 60% austenite grains embedded in a ferrite matrix being substantially free of precipitated particles of other phases, the steel consisting of the following elements in proportion by weight:

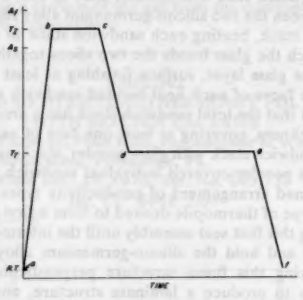
Chromium	26.5% – 30%	by weight
Nickel	7.4% – 14%	by weight
Molybdenum	2.0% – 5%	by weight
Copper	0.5% – 5%	by weight
Silicon	0.2% – 2%	by weight
Manganese	0.2% – 4%	by weight
Carbon	0.01% – 0.1%	by weight
Nitrogen	0.1% – 0.3%	by weight
Iron	Balance or remainder	

4,032,368

INTERCRITICAL-CYCLE ANNEALING

Raymond A. Grange, Washington Township, Westmoreland County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 295,391, Oct. 5, 1972, abandoned. This application Feb. 13, 1975, Ser. No. 549,631
Int. Cl.² C21D *1/00*
U.S. Cl. 148—134 8 Claims



1. A method for the annealing of hypoeutectoid steels which exhibit an A_r–A_f region greater than about 100° F, which comprises,

a. holding said steel at an intercritical temperature for a time sufficient to form a microstructure containing about 30–50% austenite and 70–50% ferrite, and

b. cooling said steel to a temperature within the range (T_T–50° F) to (T_T + 50° F) at a rate, in °F/min., which is equal to or greater than T_f–T_T/60, in which T_T is a temperature wherein the ending line of I-T diagram for said steel exhibits a minimum in time, and in which T_f=A_r +A_f/2,

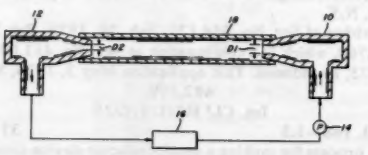
c. holding the steel within said temperature range for a time sufficient to transform all said austenite, in order that no martensite will be present on cooling to ambient temperature.

4,032,369

METHOD FOR QUENCHING FERROUS TUBING TO ACHIEVE FULL HARDENING WITHOUT QUENCH CRACKING

Chester F. Jatczak, and Richard W. Brown, both of North Canton, Ohio, assignors to The Timken Company, Canton, Ohio

Filed Feb. 2, 1976, Ser. No. 654,601
Int. Cl.³ C21D *9/08*
U.S. Cl. 148—143 5 Claims



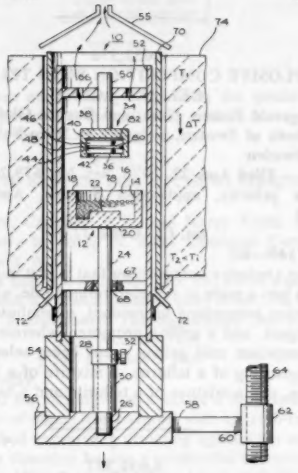
1. A method for bringing a quenching medium into contact with both the inner and outer wall surfaces of heated metallic tubing during a quench cycle, which comprises the steps of initially introducing a quenching liquid into the interior of the tubing from an entrance end and pressurizing the same by restricting its flow at the exit end of the tube whereby, throughout the entire quench cycle, the quenching liquid will uniformly contact the entire inner wall surface of the tubing,

and thereafter bringing the outer surface of the tubing into contact with a quenching liquid.

4,032,370
METHOD OF FORMING AN EPITAXIAL LAYER ON A CRYSTALLINE SUBSTRATE

Herbert F. Mataré, Los Angeles, Calif., assignor to International Audio Visual, Inc., Van Nuys, Calif.

Filed Feb. 11, 1976, Ser. No. 657,173
Int. Cl.² H01L 21/208
U.S. Cl. 148—171 **20 Claims**



1. An improved method of forming an epitaxial layer of crystalline semi-conductive material on a crystalline substrate, said method comprising:

a. contacting and wetting a clean selected crystalline substrate with a controlled thickness of selected molten melt to form a sandwich, said melt comprising a saturated solution of selected semi-conductive materials capable of forming desired semi-conductive junctions with said substrate, said contacting and wetting being carried out while shielding said sandwich from contamination;

b. maintaining said shielding while subjecting said sandwich to heat treatment comprising controlled progressive lowering of temperature of said sandwich while maintaining said melt molten and said substrate cooler than said melt until depositon of the desired epitaxial layer on said substrate is effected; and

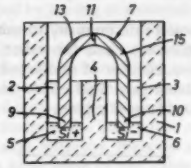
c. recovering the semi-conductive product.

4,032,371
METHOD OF MAKING A THERMO-ELEMENT

Niels Lervad Andersen, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed Apr. 14, 1976, Ser. No. 676,737
Claims priority, application Germany, Apr. 30, 1975, 2519338
Int. Cl.² H01L 21/208
U.S. Cl. 148—171 **10 Claims**

1. A method of making a thermo-element of the type having two sections of different thermo-electric properties connected in series comprising the steps of forming a porous base body with interconnected pores, introducing a molten p-type conductor material into said pores of one of said sections, and

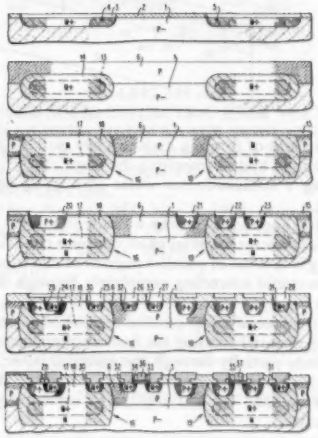


introducing a molten n-type conductor material into said pores of the other of said sections.

4,032,372
EPITAXIAL OUTDIFFUSION TECHNIQUE FOR INTEGRATED BIPOLAR AND FIELD EFFECT TRANSISTORS

Madhukar B. Vora, Beacon, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 138,161, April 28, 1971, abandoned. This application Sept. 10, 1975, Ser. No. 612,140
The portion of the term of this patent subsequent to Mar. 27, 1990, has been disclaimed.
Int. Cl.² H01L 21/225, 21/20, 21/76
U.S. Cl. 148—175 **7 Claims**



1. A method for making monolithic semiconductor devices comprising the steps of:

Providing a semiconductor substrate of one conductivity type,

introducing two impurities of different diffusion rates and of the other conductivity type into said substrate through each of a plurality of desired surface locations,

the concentration of the impurity having the lower diffusion rate being greater than the concentration of the impurity having the higher diffusion rate,

forming an epitaxial layer of semiconductor material on said substrate and over said locations, said expitaxial layer being of the same conductivity type as said substrate,

heating said epitaxial layer and said substrate to outdiffuse said higher diffusion rate impurity completely through said epitaxial layer to reach the surface of said epitaxial layer opposite the interface between said epitaxial layer and said substrate,

forming at one of said desired surface locations a bipolar

transistor wholly within the region of said epitaxial layer through which said higher diffusion rate impurity has outdiffused completely through said expitaxial layer to reach said surface of said epitaxial layer opposite said interface,

said higher diffusion rate impurity forming the collector of said bipolar transistor and the other of said impurities forming the subcollector of said bipolar transistor, and

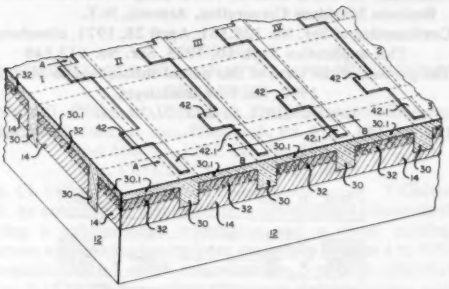
forming an insulated gate field effect transistor in said epitaxial layer outside said region.

4,032,373

METHOD OF MANUFACTURING A DIELECTRICALLY ISOLATED SEMICONDUCTIVE DEVICE

Tuh-Kai Koo, Colorado Springs, Colo., assignor to NCR Corporation, Dayton, Ohio

Filed Oct. 1, 1975, Ser. No. 618,717
Int. Cl.² H01L 21/223
U.S. Cl. 148—175 7 Claims



1. A method of forming dielectrically isolated islands in a semiconductor body comprising the steps of:

selecting a semiconductor wafer of a given conductivity-type;

providing one surface of the wafer with a layer of epitaxial semiconductor material of an opposite conductivity-type;

forming a first set of parallel regions of electrically insulating material extending completely through the epitaxial layer;

forming a second set of parallel regions of electrically insulating material crossing the first set of regions and extending only partially through the epitaxial layer; and

forming circuit components in the islands of the epitaxial layer isolated by said regions of electrically insulating material.

4,032,374

CINNAMIC ACID CONTAINING PYROTECHNIC SMOKE COMPOSITION

Bernard E. Douda, Bloomfield, and John E. Tanner, Jr., Bloomington, both of Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 22, 1976, Ser. No. 725,606
Int. Cl.² C06B 45/10
U.S. Cl. 149—19.8 5 Claims

1. A non-toxic smoke composition comprised, by weight, of between 45.5 parts and 75.5 parts of cinnamic acid, between 5.5 parts and 12.5 parts of sugar, between 13 parts and 29 parts of potassium chlorate, between 4 parts and 10.5 parts of sodium bicarbonate, between 2 parts and 5 parts of diatomite silica, and between 2 parts and 5 parts of a binder.

4,032,375

BLASTING COMPOSITION CONTAINING CALCIUM NITRATE AND SULFUR

Daniel A. Wasson, Salt Lake City, Utah, assignor to Ireco Chemicals, Salt Lake City, Utah

Filed Jan. 20, 1975, Ser. No. 542,280
Int. Cl.² C06B 33/14
U.S. Cl. 149—41 14 Claims

1. A blasting composition comprising inorganic oxidizer salt which is partially or completely dissolved in a liquid fluid phase and which includes calcium nitrate in an amount of at least about 20% by weight based upon the total composition; solid or liquid fuel or both; thickener; and at least about 3% by weight sulfur, which functions as a sensitizer in combination with the calcium nitrate.

4,032,376

EXPLOSIVE COMPOSITION WITH TELLURITE GELLING AGENT

Kåre Ragnvald Fossan, Nora, and Gunnar Olof Ekman, Gyttorp, both of Sweden, assignors to Nitro-Nobel A.B., Gyttorp, Sweden

Filed Apr. 22, 1976, Ser. No. 679,240
Claims priority, application Sweden, Apr. 29, 1975, 7504939
Int. Cl.² C06B 31/30
U.S. Cl. 149—60 9 Claims

1. In an explosive composition that is first in fluid form and then gels into a paste at a predetermined rate, which explosive composition comprising an oxidant, a combustible, water, a gelling agent, and a gelling promoter, wherein the improvement comprises: said gelling agent being selected from the group consisting of a tellurite, a mixture of a tellurite and a chromate, and a mixture of a tellurite and a bichromate.

4,032,377

METHOD FOR THE PRODUCTION OF HIGH-PURITY TRIAMINOTRINITROBENZENE

Theodore M. Benziger, Santa Fe, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,403
Int. Cl.² C06B 25/04; C07C 79/10
U.S. Cl. 149—105 3 Claims

1. In a method for preparing sym-triaminotrinitrobenzene which comprises nitration of 1,3,5-trichlorobenzene to 1,3,5-trichloro-2,4,6-trinitrobenzene followed by amination to sym-triaminotrinitrobenzene, the improvement which comprises, in the amination step, adding sufficient water to the solvent for the 1,3,5-trichloro-2,4,6-trinitrobenzene that the byproduct ammonium chloride formed during the amination is rendered at least semideliquescent.

4,032,378

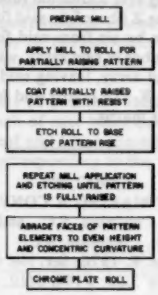
METHOD OF FORMING PATTERN ROLL

James L. McDonald, and Christian Toussieux, both of Charlotte, N.C., assignors to Consolidated Engravers Corporation, Charlotte, N.C.

Division of Ser. No. 522,785, Nov. 11, 1974, Pat. No. 3,993,532. This application Sept. 3, 1976, Ser. No. 720,204
Int. Cl.² C23F 1/02
U.S. Cl. 156—645 4 Claims

1. The method of forming a pattern roll for use in opposition to a sonic horn for fusing heat responsive material interposed therebetween, which method comprises preparing a mill for a predetermined pattern of discrete horn opposing elements projecting from a base rib, applying said mill to a roll body for partially raising said pattern at the roll body surface, coating

the partially raised pattern with a resist and etching the roll body to the base of the pattern rise, and then repeating the


PREPARE MILL
APPLY MILL TO ROLL FOR PARTIALLY RAISING PATTERN
COAT PARTIALLY RAISED PATTERN WITH RESIST
ETCH ROLL TO BASE OF PATTERN RISE
REPEAT MILL APPLICATION AND ETCHING UNTIL PATTERN IS FULLY RAISED
ABRADE FACES OF PATTERN ELEMENTS TO EVEN HEIGHT AND CONCENTRIC CURVATURE
CHROME PLATE ROLL

mill application and etching steps until the predetermined pattern is fully raised at the roll body surface.

4,032,379

NITRIC ACID SYSTEM FOR ETCHING MAGNESIUM PLATES

David L. Czirr, Cresskill, N.J., and Harry Kroll, Warwick, R.I., assignors to Philip A. Hunt Chemical Corporation, Palisades Park, N.J.

Division of Ser. No. 441,342, Feb. 11, 1974, Pat. No. 3,935,118, which is a continuation-in-part of Ser. No. 337,879, March 5, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,765

Int. Cl.[2] B41C *1/00*

U.S. Cl. 156—659 **33 Claims**

1. A method for etching bare areas of a magnesium plate, other portions of which are covered with an etch-resist pattern, said method comprising directing against the surface of said plate, in a direction having a substantial component perpendicular to said surface, an etching liquid including

I. a strong inorganic acid,

II. at least one liquid fatty monocarboxylic acid having from 6 to 26 carbon atoms which is substantially nonreactive with the inorganic acid,

III. at least one organophosphonic acid,

IV. at least one alkylaryl sulfonic acid,

V. at least one surfactant or coupling agent, and

VI. water.

4,032,380

METHOD OF JOINING OF INSULATED HIGH-VOLTAGE CABLES

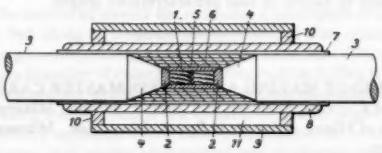
Gotthard Valentin Olsson, Spanga, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Continuation of Ser. No. 457,572, April 3, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,375

Claims priority, application Sweden, Apr. 13, 1973, 7305335

Int. Cl.[2] B21F *15/02*

U.S. Cl. 156—49 **3 Claims**



1. A method of joining two lengths of cables having a central conductor surrounded by an inner layer of semi-conducting material which is in turn surrounded by an outer layer of solid polymer material, said method comprising the steps of stripping an end of each cable down to the central conductor whereby an end portion of each central conductor is exposed and the layer of semi-conducting material and layer of solid polymer material taper to form two frusto-conically shaped insulation ends; fixed by joining in a smooth abutting relationship the end portions of the central conductors; winding tape of semi-conducting material about the stripped end portions of the central conductors and in contact with the taper of the inner layer of semi-conducting material so as to form thereupon a first layer of semi-conducting material having substantially the same thickness as the inner layer of semi-conducting material on the cable whereby there is a smooth uniform transition from the inner layer of one cable to the inner layer of the other cable; then wrapping a tape of vulcanizable insulation material about the layer of semi-conducting material and the tapered portion of the outer layers so as to form a second layer substantially flush with the peripheral outline of the cable insulation; positioning against the formed second layer a plurality of axially extending metal strips, the metal strips longitudinally spanning and peripherally surrounding the formed second layer to form a third layer which is axially rigid; wrapping circumferentially around the third layer of metal strips an elastic element which lies pressure directed radially inward on the metal strips; removably jacketing said third layer with heating means; heating the layer of insulation tape to a temperature and for a period of time for causing vulcanization of the insulation tape forming the second layer; removing the heating means when vulcanization is completed; and finally removing the elastic element and the metal strips.

4,032,381

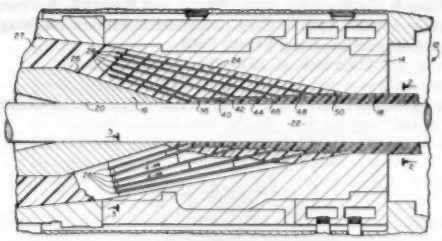
EXTRUDED SOLID DIELECTRIC HIGH VOLTAGE CABLES WITH MULTI-LAYER INSULATION

George S. Eager, Jr., Upper Montclair, and David W. Riley, Plainfield, both of N.J., assignors to General Cable Corporation, Greenwich, Conn.

Division of Ser. No. 466,081, May 1, 1974, abandoned. This application Apr. 25, 1975, Ser. No. 571,551

Int. Cl.[2] H01B *7/02*

U.S. Cl. 156—51 **4 Claims**

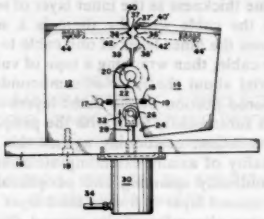


1. The method of raising the electrical breakdown stress in volts per mil of thickness of the insulation on a cable which comprises applying the insulation to a cable core in a single extruder through which the cable core passes and as a plurality of successive layers of the same composition insulating material superimposed over one another to a predetermined total radial thickness of the insulation, the successive layers being formed by breaking up the mass of insulating material in the extruder into a plurality of separate streams, and extruding the separate streams as said plurality of successive layers around the cable core, and supplying said layers by simultaneous extrusion and at temperatures that cause the layers to fuse to one another free of voids at the interfaces of the successive layers.

4,032,382
METHOD AND APPARATUS FOR SPLICING THERMOPLASTIC MONOFILAMENT MATERIAL BY HIGH FREQUENCY VIBRATORY ENERGY

Edward G. Obeda, Brookfield, Conn., assignor to Branson Ultrasonics Corporation, New Canaan, Conn.

Filed Nov. 15, 1976, Ser. No. 742,019
Int. Cl.² B32B 5/26
U.S. Cl. 156—73.2 11 Claims



1. A method of splicing two thermoplastic monofilaments by high frequency vibratory energy to provide a single filament of predetermined cross sectional area comprising the steps of:

disposing two thermoplastic monofilaments in overlapped relation in a support having forming means and an adjoining flash receiving cavity means;

applying high frequency vibratory energy to the monofilaments in the region of overlap for softening the respective monofilaments and urging thermoplastic material in excess of the predetermined cross sectional area into the flash receiving cavity;

removing the vibratory energy;

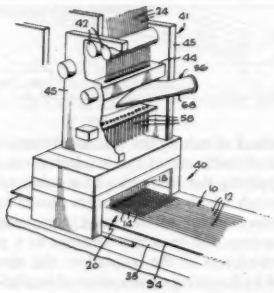
urging the two monofilaments while in the forming means and softened state into intimate contact with one another and the monofilament facing wall of the forming means for causing a splice having said predetermined cross sectional area, and

removing the splice from the support.

4,032,383
FIBER INSERTION DEVICE FOR CONTINUOUS 3D FOAMING MACHINE AND METHOD

William B. Goldsworthy, Palos Verdes, and Harald E. Karlson, Santa Monica, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Nov. 4, 1975, Ser. No. 628,802
Int. Cl.² B32B 5/20
U.S. Cl. 156—79 18 Claims

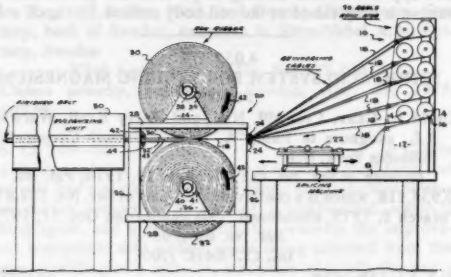


1. A method of forming three-dimensional fiber reinforced foam insulation which comprises forming an array of layers of fibers, each said layer consisting of spaced X fibers extending in a longitudinal direction and spaced Y fibers extending in a transverse direction, and forming openings between adjacent X-Y fibers in said layers, providing tubes positioned above said array, providing additional tubes below said first mentioned tubes, inserting said additional tubes into said openings of said array, inserting Z fibers into said first mentioned tubes, blowing said Z fibers by air from said first mentioned tubes into said additional tubes in said array, withdrawing said additional tubes from said array, leaving said Z fibers inserted in said array to form an X-Y-Z matrix and foaming an insulation material through said matrix.

4,032,384
METHOD OF MAKING A CONVEYOR BELT

David A. Rauscher, Columbia, S.C., assignor to Cable Conveyor Systems, Inc., Columbia, S.C.

Filed Jan. 8, 1976, Ser. No. 647,312
Int. Cl.² B29H 7/22; F16G 3/10; G03D 15/04
U.S. Cl. 156—137 11 Claims



1. A method of fabricating a conveyor belt having continuous loops of reinforcing cable embedded in a loop of rubber material comprising the steps of:

a. feeding first and second elongated webs of raw rubber from first and second web supply means into facing abutting relationship;

b. concurrently feeding a plurality of parallel cable members equal to the desired number of continuous loops of reinforcing cable to and between said first and second webs of raw rubber to provide an unbonded sandwich array in which said cable members extend between said webs substantially parallel to the axes of said webs;

c. guiding a predetermined length of said sandwich array into vulcanizing means and subsequently activating said vulcanizing means for a given time period to effect curing and bonding of said first and second webs of predetermined length of said sandwich array to provide a section of unitary cable reinforced belt; and

d. concurrently effecting the spliced junction of the trailing end of selected ones of said cable members to the forward end of a next succeeding cable during selected ones of said given time periods while said vulcanizing means is activated so that the cable splices are spaced apart longitudinally along the length of the belt from the next adjacent splice on any of the other cables by a length substantially in excess of said predetermined length.

4,032,385
METHOD OF MAKING AN ADDRESS MASTER CARD SET

Eduard C. Petry, Hopkins, and John R. Stielow, Minneapolis, both of Minn., assignors to Speedaddress, Inc., Minneapolis, Minn.

Filed Apr. 26, 1976, Ser. No. 680,035
Int. Cl.² B32B 31/00
U.S. Cl. 156—252 3 Claims

1. A method for making address master card sets which comprise an address master card and a removably attached

sheet with a hectographic carbon coating positioned adjacent to an address imprint area of said card, said method comprising the steps of:

unrolling a continuous strip of sheet material from a first roll of flexible sheet material coated on one side with two continuous bands of hectographic carbon coating, said bands being located on either side of a centerline of said strip;

punching a plurality of generally rectangular shaped holes in said strip, each of said holes being located along the centerline thereof and being spaced from adjacent holes by a distance corresponding to the width of said address master card;

applying a continuous strip of adhesive tape with its adhesive coated side adjacent to the uncoated side of said strip of sheet material along said centerline, said adhesive tape completely covering said plurality of holes;

slitting said strip of sheet material and said tape along said centerline;

cutting said strip of sheet material into individual sheets having a width corresponding to the width of said address master card;

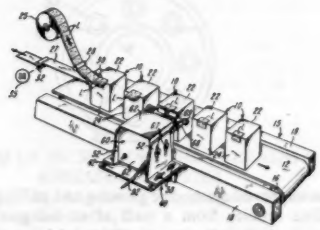
aligning each of said individual sheets with one of said address master cards with the hectographic carbon coating positioned adjacent to said address imprint area of said card; and

pressing said individual sheet and adhesive tape in the vicinity of said holes to bond said sheet to said card.

4,032,386
DEVICE FOR APPLYING LABELS TO ARTICLES

Ronald P. J. Fleet, Landing, N.J., assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Continuation of Ser. No. 512,727, Oct. 7, 1974, abandoned.
This application July 26, 1976, Ser. No. 708,531
Int. Cl.² B29C *17/00*
U.S. Cl. 156—475 10 Claims

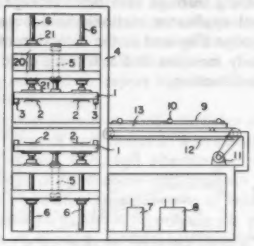


1. An improved device for receiving a succession of articles being fed along a predetermined path and for successively applying corresponding labels to the articles, said device comprising a plurality of rotary applicators each including a plurality of outwardly projecting flexible wiping elements, a shaft supporting said applicator for rotation in axially aligned relation, power operated drive means connected to rotate said applicator, said wiping elements of one applicator being disposed in angular offset relation to said wiping elements of the other said applicator, and means supporting said shaft and said applicators for adjustment relative to both the height and width of the articles being fed along said path for conveniently accommodating articles of different sizes and configurations.

4,032,387
WELDING APPARATUS

Masamichi Sugiyama, Isehara; Ryuzo Ebina, Tokyo; Minoru Tanaka, Kawasaki; Ikuo Sukekawa, Yokohama, and Susumu Sawada, Machida, all of Japan, assignors to Mitsubishi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 8, 1975, Ser. No. 611,550
Claims priority, application Japan, Sept. 12, 1974, 49-105288
Int. Cl.² B30B *15/06, 15/34*
U.S. Cl. 156—497 9 Claims



1. In welding apparatus of the class comprising a pair of opposed pressing boards, means to move said pressing boards toward and away from each other for receiving therebetween superposed articles to be welded together, a heated platen for heating the surfaces of said articles, means for reciprocating said heated platen between an operative position defined between said pressing boards and an inoperative position defined outside of the area between said pressing boards, a holding mechanism for holding said articles to be welded upon the opposing surfaces of said pressing boards, and spacer means for defining predetermined gaps between said heated platen and said pressing boards, the improvement comprising:

said spacer means is mounted upon either one or both of said pressing boards and said heated platen and has a height smaller than the thickness of the article to be welded so that the surface layer of said article having a thickness equal to the difference between the thickness of said article and the height of said spacer is fused by said heated platen; and

said holding mechanism comprises suction disc means made of resilient material and connected to a source of vacuum, and disposed in a recess of said pressing board, and spring means is provided for biasing said suction disc so as to normally protrude beyond the inner surface of said pressing head, yet when said suction disc is actuated so as to attract said article to be welded and said pressing board is actuated toward said platen, said suction disc is retracted into said recess against the biasing force of said spring means.

4,032,388
TRANSFER MECHANISM

Leon Tucker Dunning, 911 Bond St., Sarnia, Ontario, Canada

Filed Nov. 19, 1975, Ser. No. 633,166
Int. Cl.² B65C *9/10, 9/14*
U.S. Cl. 156—568 9 Claims

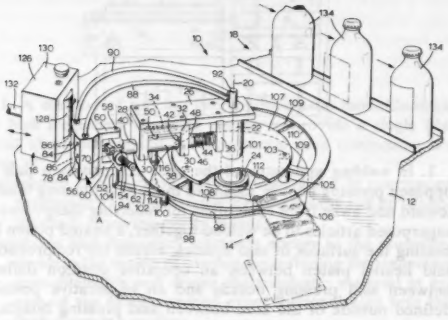
1. In a labelling device having a frame, a label storage station, a glue applicator station, and a label applicator station circumferentially spaced from one another about a central axis of said frame, said label storage station having a label storage magazine opening inwardly thereof for storing a plurality of labels in a face-to-face relationship, a label transfer device comprising,

a. a main body member mounted on said frame for rotation about said central axis,

b. at least one arm member slidably mounted on said main body member and projecting radially from said main

body member, each said arm member having a longitudinal axis projecting radially from said central axis of said main body member, and each said arm member being slidable with respect to said main body member in a direction along said longitudinal axis,

c. a head pivotably mounted on each arm member for movement about a secondary axis parallel to said central axis, said secondary axis being located on said logitudinal axis of said arm member, said head having an outer surface which is curved in the plane of rotation of said head about said central axis, said head being rotatable with said main body member with said outer surface disposed in a path passing through said label storage, glue applicator and label applicator stations, said outer face having a leading edge disposed in the direction of rotation of said main body member and a trailing edge disposed in the opposite direction,



d. first guide means for guiding said head to pivot about said secondary axis to angularly incline said head to a first position as it approaches said label storage station in which said trailing edge of said head is disposed radially outwardly of said leading edge whereby said trailing edge is the first portion of said head to engage a label in said storage station, said first guide means being adapted to cause said head to pivot about said secondary axis from said first position to a second position in which said leading edge is disposed radially outwardly of said trailing edge whereby said outer surface is rocked about said secondary axis during movement of said head through said label storage station, and

e. means for securing said label to said outer surface of said head as it moves through said label storage station to be transferred thereby to said labelling station.

4,032,389

APPARATUS FOR AUTOMATICALLY CONTROLLING CRYSTAL GROWTH

Gordon Charles Joyce, Malvern, England, assignor to National Research Development Corporation, London, England

Filed Mar. 31, 1975, Ser. No. 563,443

Claims priority, application United Kingdom, Mar. 29, 1974, 14167/74

Int. Cl.² B01J *17/18;* **H05B** *5/06*

U.S. Cl. 156—601 **4 Claims**

1. Apparatus for automatically controlled crystal growth comprising:

a container for containing a melt of crystallisable material,

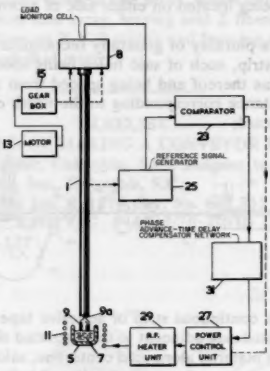
an electrical heater for heating said material to establish a melt of said material,

means for supplying electrical power to energize said heater,

means for pulling a crystal from said melt when established,

a monitor arrangement for monitoring a function of a physical property of the growing crystal related to the cross-section of the crystal including means for monitoring the weight of the crystal,

a comparator for comparing said function with its expected value to derive a control signal from any difference between said function and its expected value,



a feedback loop from said comparator to said means for supplying power to apply said control signal to adjust said power, and

means for advancing the phase of changes in said control signal to compensate for delay in the transfer of heat from said heater to the interface between said melt and said growing crystal.

4,032,390

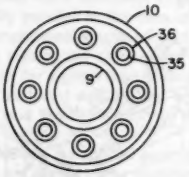
PLURAL CRYSTAL PULLING FROM A MELT IN AN ANNULAR CRUCIBLE HEATED ON BOTH INNER AND OUTER WALLS

Dale W. Rice, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 445,630, Feb. 25, 1974, Pat. No. 3,961,905. This application Sept. 18, 1975, Ser. No. 614,429

Int. Cl.² B01J *17/18*

U.S. Cl. 156—608 **3 Claims**



1. An improved method of growing and pulling a plurality of crystalline articles from a melt of an inorganic, crystalline material including the steps of establishing a temperature controlled melt of the inorganic crystalline material in a crucible, contacting the melt with a plurality of crystal seeds, and withdrawing the seeds at a rate not exceeding the rate of crystal growth thereon wherein the improvement comprises

establishing the melt in an annular crucible having a generally U-shaped cross-section including an inner annular wall and an outer annular wall, disposing the crystal seeds in a circumferentially spaced arrangement within the crucible

simultaneously heating the crucible inner annular wall and the outer annular wall, and

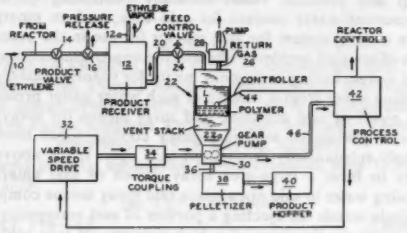
maintaining a substantially uniform radial temperature distribution in the melt between the inner annular wall and the outer annular wall.

4,032,391

LOW ENERGY RECOVERY COMPOUNDING AND FABRICATING SYSTEMS FOR PLASTIC MATERIALS

Isaac Moked, New Brunswick; Richard H. Handwerk, Somerville, and Walter R. Marshall, Bloomfield, all of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Sept. 3, 1975, Ser. No. 609,947
Int. Cl.² B01D *1/00, 1/28;* F01C *1/18*
U.S. Cl. 159—47 R 7 Claims



1. In a process for the production of polymer wherein a liquid polymer melt and entrained volatile monomer are delivered from a reactor to a product receiver for partial flashing of the volatile monomer the improvement comprising the steps of transferring the polymer from the bottom of said product receiver to the top of a vent stack; flashing the remaining volatile monomer from the melt in the vent stack; discharging said polymer melt from the bottom of the vent stack into the inlet of a gear pump having a pair of horizontal, intermeshing, rotating gears; directing the melt between said gears with the use of a pair of opposed cylindrical surfaces whose elements are parallel to the gear axes, said surfaces extending below the plane of the gear axes and each surface defining with its proximate gear axis a decreasing hydraulic radius toward the bottom pump discharge; discharging pressurized melt from the intermeshing gears through an outlet having a width corresponding to the gear width and a length corresponding to the tooth height of said gears, respectively, while providing a seal between each gear and the pump housing adjacent the outlet; sensing and maintaining the level of liquid in said stack to provide a pressure head above said gear pump.

4,032,392

METHOD OF INCREASING THE FREENESS OF ASBESTOS SLURRIES

Frank J. Koller, Jr., Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Aug. 6, 1976, Ser. No. 712,148
Int. Cl.² D21F *11/00*
U.S. Cl. 162—155 5 Claims

1. In a method of making beater-saturated asbestos sheets by forming a slurry of asbestos fibers in water, precipitating a synthetic non-film-forming organic binder in particulate form on said fibers to form a slurry of coated fibers, draining said slurry of coated fibers and forming a product therefrom, the improvement in controlling said draining comprising adding to the slurry of coated fibers a film-forming secondary binder of poly(vinylidene chloride) or copolymers thereof wherein said synthetic, non-film-forming organic binder and said film-forming secondary binder of poly(vinylidene chloride) or copolymers thereof are first blended in a ratio of about 85:15 to 75:25 and added to said slurry of asbestos fibers in water.

4,032,393

FIRE RETARDANT WEBS AND INTERNAL TREATMENT THEREFOR

Franz J. Alfeis, and Raymond W. Goldsmith, both of Lockport, N.Y., assignors to The Upson Company, Lockport, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,388
Int. Cl.² D21F *13/00, 13/02;* D21J *1/04, 1/16*
U.S. Cl. 162—159 15 Claims

1. A process for the internal treatment of cellulosic webs to impart improved fire retardancy thereto, comprising the steps of:

a. admixing cellulosic fibers and an effective quantity of a fire-retardant filler of hydrated aluminum oxide particles;
b. consolidating the admixture into a self-sustaining web comprises of a physical admixture of discrete aluminum oxide particles and cellulosic fibers; and.,
c. compressing said web to impart improved fire retardancy characteristics thereto;

wherein said hydrated aluminum oxide particles are added to be present in the range of from about 27% to about 36% based upon the weight of said web, and wherein the compressing step provides a force of from about 300 to about 700 pounds per linear inch to yield an ultimate density of said web in the range of from about 38 to about 52 pounds per cubic foot.

8. The process of claim 1, further comprising the step of laminating a plurality of said webs to form a construction board.

9. A cellulosic web having improved fire retardancy characteristics comprised of a compressed, intimate physical admixture of discrete cellulosic fibers and an effective quantity of discrete fire-retardant hydrated aluminum oxide particles, wherein said aluminum oxide particles comprise from about 27% to about 36% of the weight of the web, said web having a density in the range of from about 38 to about 52 pounds per cubic foot.

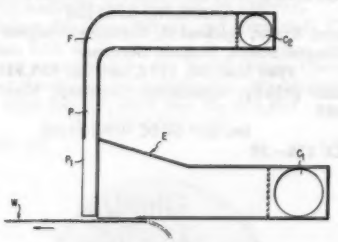
13. A laminated construction board comprised of a plurality of the webs of claim 9.

4,032,394

METHOD OF MAKING WET-PRESSED FIBERBOARD OF HIGH RESISTANCE TO BENDING

Ernst Ludvig Back, Vikbyvagen 42, S-181 43 Lidingo, Sweden

Filed May 20, 1975, Ser. No. 579,243
Claims priority, application Sweden, May 20, 1974, 7406675
Int. Cl.² D21H *3/36, 5/02*
U.S. Cl. 162—164 R 11 Claims



1. In a method of manufacturing wet-pressed fiber board material of uniform thickness in which a layer of fiber-water suspension is prepared, said layer being de-watered and pressed to form a coherent flat sheet, the improvement comprising distributing said fiber-water suspension over the surface of said layer in a manner such that the pressed board product contains strip-like surface portions which extend in at least one direction of the horizontal plane of the sheet, said strip-like surface portions having varying densities, whereby the finished board has a higher resistance to bending than a

homogeneous sheet having substantially the same average density.

4,032,395

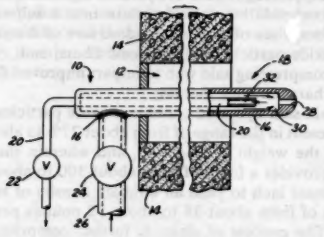
FUEL LEAK DETECTION APPARATUS FOR GAS COOLED NUCLEAR REACTORS

Richard D. Burnette, San Diego, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Oct. 7, 1974, Ser. No. 512,531

Int. Cl.² G21C *17/02*

U.S. Cl. 176—19 LD **9 Claims**



1. Apparatus for use in the detection of gaseous radioactive iodine in the gaseous coolant of a nuclear reactor comprising:

elongated probe means extending through a penetration of a reactor vessel to the gaseous coolant stream, said elongated probe being sealed to prohibit leakage of said coolant from between said probe and the penetration;

said probe means having an outer generally cylindrically shaped wall, a conduit means positioned inside of said outer wall and defining a first passage adapted to communicate gaseous coolant therethrough, the area between said conduit means and said outer wall providing a second passage, said inner conduit means terminating adjacent the end of said probe means so as to define a reservoir, the outer wall of said probe means having an orifice therein for selectively communicating gaseous coolant from said stream to said reservoir in response to the relative pressures on opposite sides of said orifice;

valve means adapted to selectively open and close said first and second passages to permit flow therethrough;

said conduit means having an iodine absorption bed located therein adjacent the reservoir.

4,032,396

PRESSURIZED-WATER REACTOR EMERGENCY CORE COOLING SYSTEM

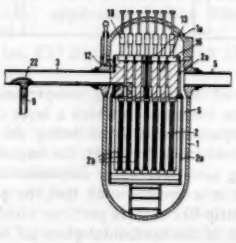
Wolfgang Braun, Buckenhof, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 28, 1974, Ser. No. 455,913

Claims priority, application Germany, Mar. 30, 1973, 2316007

Int. Cl.² G21C *9/00*, *15/00*

U.S. Cl. 176—38 **7 Claims**



1. A pressurized-water reactor comprising a pressure vessel having a lower portion and an upper portion, a core in said lower portion, coolant inlet and outlet connections opening through said upper portion, a core barrel surrounding said core and extending upwardly to above said connections and forming a coolant descent space opening from and extending from said inlet connection downwardly to below said barrel and the barrel internally forming a substantially open space above said core and opening to said outlet connection, a main coolant loop having a cold leg connected to said inlet connection and a hot leg connected to said outlet connection, said loop and pressure vessel normally containing circulating pressurized-water coolant for said core; and an emergency core cooling system for said reactor for use in the event of a loss-of-coolant accident; wherein the improvement comprises said system having emergency means for supplying emergency cooling water from a volume of such water under pressure in the event of said accident, and spray means for spraying at least a portion of said emergency cooling water from said supply substantially throughout said open space above said core to form a large-area spray screen of said emergency cooling water in said open space said spray means comprising a single nozzle for ejecting a portion of said emergency cooling water in the form of a high velocity jet into said open space, said nozzle being directed horizontally through the wall of said vessel into said open space and wherein control rod guide tubes extend upwardly from said core and said open space is formed between and around said guide tubes, said nozzle ejecting said jet against at least one of said guide tubes.

4,032,397

BURST SHIELD CONTAINMENT FOR NUCLEAR REACTOR AND METHOD OF OPERATING SAME

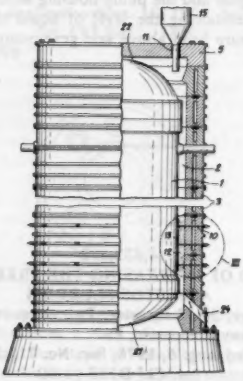
Burkhard Beine, Tonisvorst, and Franz Schilling, Kempen, both of Germany, assignors to Siempelkamp Giesserei AG, Krefeld, Germany

Filed Apr. 18, 1975, Ser. No. 569,157

Claims priority, application Germany, Apr. 19, 1974, 2419033

Int. Cl.² G21C *11/00*, *9/00*

U.S. Cl. 176—38 **8 Claims**



1. A method of operating a nuclear reactor having a nuclear reactor core spacedly surrounded by a burst shield consisting of a multiplicity of stacked cast iron cylinder sections, comprising the step of:

filling the space between said core and said burst shield with an incompressible fluent medium in the form of a flowable particulate solid to eliminate any free burst path between said core and said shield and to distribute burst forces uniformly to said shield;

removing said fluent medium for inspection of said space, said space being filled with said flowable particulate solid by the steps of:

forming a partition in said space set outwardly from said core by a distance at least sufficient to enable thermal expansion of said core as it is brought to operating temperature;

introducing said particulate solid between said partition and said shield in a relatively cool state of said reactor core;

bringing said reactor core to operating temperature; and thereafter displacing said partition into contact with said core and thereby eliminating any free burst path between said core and said shield.

4,032,398

NUCLEAR REACTOR FUEL SUB-ASSEMBLIES

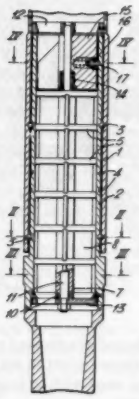
Andrew Cross, Lymm; Anthony Randle Lunt, Warrington, and Joseph Brian Doherty, Cheadle, all of England, assignors to United Kingdom Atomic Energy Authority, England

Filed May 3, 1976, Ser. No. 682,591

Claims priority, application United Kingdom, May 7, 1975, 19171/75

Int. Cl.² G21C *3/00*

U.S. Cl. 176—43 **3 Claims**



1. A nuclear reactor fuel sub-assembly comprising:

a tubular wrapper for conducting coolant flow,

a bundle of spaced fuel pins within the tubular wrapper, and

variable flow restriction means disposed in a region of the sub-assembly which is upstream of the fuel pins with respect to coolant flow, the restriction means comprising means defining a plurality of discrete axially extending ducts for coolant flow, a series of spaced flow restrictors within the ducts, the restrictors of each duct being arranged to offer a different restriction to fluid flow than the restrictors in the other ducts, and a valve member for directing coolant flow through a selected one of the ducts.

4,032,399

INTEGRATED FAST REACTOR OF THE LIQUID METAL COOLED TYPE

Jean Defauchy, St-Michel-sur-Orge, and Claude Malaval, Antony, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

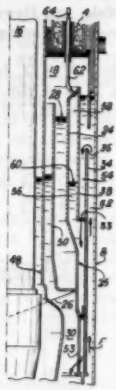
Filed Nov. 13, 1975, Ser. No. 631,601

Claims priority, application France, Nov. 14, 1974, 74.37575

Int. Cl.² G21C *15/02*

U.S. Cl. 176—62 **6 Claims**

1. A nuclear reactor comprising a main vessel, a reactor core within said main vessel, fuel assemblies in said core, a support structure in said main vessel supporting said fuel assemblies, a liquid metal coolant in said core which flows upwardly through said fuel assemblies and exiting said core as hot metal coolant, primary heat exchangers in said main vessel receiving said hot coolant from said core, cold liquid metal coolant exiting from said heat exchanges into an intervessel space in a bottom zone of said main vessel, a primary enclosing said vessel core and separating said intervessel space from the zone containing said hot metal coolant, pumps in said intervessel space withdrawing said cold liquid metal from said intervessel space and reinjecting said cold liquid metal under pressure into a lower portion of said fuel assemblies, a circuit for cooling said main vessel supplied with a fraction of said cold liquid metal, said coolant circuit including on one side



said main vessel and a flow reversing baffle plate, said flow reversing baffle plate comprising a first shell within said main vessel said coolant circuit including on the other side at the top portion of said main vessel said flow reversing baffle plate and a counter baffle, said counter baffle comprising a second shell which surrounds said primary vessel, said first shell surrounding said second shell, an annular chamber above said cold liquid metal between said second shell and said primary vessel and an inert gas in said annular chamber forming a gas/liquid metal interface chamber at a pressure such that the gas/liquid metal interface within said chamber is located below the top of said flow reversin baffle plate.

4,032,400

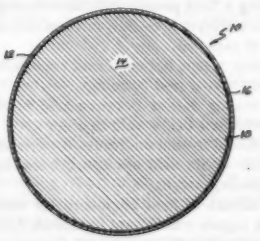
NUCLEAR REACTOR FUEL ELEMENT WITH VANADIUM GETTER ON CLADDING

Carl E. Johnson, Elk Grove Village, and Kenneth G. Carroll, La Grange, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 17, 1976, Ser. No. 658,805

Int. Cl.² G21C *3/06*

U.S. Cl. 176—67 **5 Claims**



1. A nuclear fuel element comprising:

a tubular shaped outer metallic cladding having an inner surface and sealed ends, the cladding having walls 10 to 15 mils thick;

a thin layer of vanadium as an oxygen getter bonded to the inner surface of the cladding to form an integral member; and

a central core of actinide fuel material disposed within the cladding, said core being movable relative to the cladding.

4,032,401

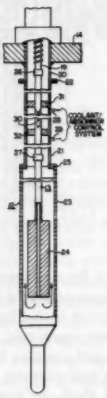
COMBINED SOLID AND LIQUID SYSTEM FOR CONTROLLING NUCLEAR REACTORS

Reinhard Froelich, Scottdale, and Howard W. Yant, Greensburg, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 267,812, June 30, 1972. This application Aug. 2, 1974, Ser. No. 494,431

Int. Cl.² G21C 7/22

U.S. Cl. 176—86 R 8 Claims



1. A control and shutdown system for a nuclear reactor, said nuclear reactor comprising a vessel, a vessel closure head, a nuclear core in said vessel, a coolant liquid circulating system for circulating a first cooling liquid into and out of said vessel for cooling said nuclear core, said control system comprising:

a. control rod drive mechanism affixed to said head,

b. an elongated hollow control rod enclosure stationary during reactor operation extending vertically downward from said mechanism through said head and said core and being closed at its bottom,

c. a control rod shaft cooperatively associated with said mechanism for selected vertical positioning within said enclosure, said shaft having a hollow portion and openings in said shaft for receiving a fluid into said hollow portion,

d. a control rod comprised of a solid neutron absorbing material removably coupled to the bottom of said shaft and having a fluid passageway therethrough in fluid communication with said hollow portion and extending to the bottom of said rod,

e. first sealing means between said enclosure and said shaft positioned above said openings,

f. second sealing means between said enclosure and said shaft positioned below said openings,

g. means affixed to said enclosure for inletting a liquid into the region within said enclosure between said first and second sealing means,

h. means affixed to said enclosure for outletting a liquid from the region within said enclosure below said second sealing means, and

i. means connecting said inletting and outletting means for selectively circulating a neutron absorber liquid and a second reactor coolant liquid through said shaft, said rod, and said enclosure, said connecting means forming a closed flow loop isolated from the flow of said first cooling liquid, said neutron absorber liquid serving to shut down said nuclear reactor, and said second reactor coolant serving to remove heat generated within said control rods.

4,032,402

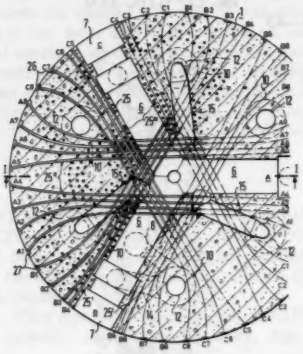
CYLINDRICAL PRESTRESSED CONCRETE TANK FOR A NUCLEAR POWER PLANT

Malcolm Horner, Wolviston, England; Alija Hodzic, and Dirk Haferkamp, both of Mannheim, Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Cologne, Germany and Taywood Engineering Limited,, Southall, United Kingdom

Filed May 4, 1976, Ser. No. 683,074

Int. Cl.² G21C 13/04

U.S. Cl. 176—87 13 Claims



1. A cylindrically shaped prestressed concrete pressure tank for a nuclear reactor power plant in which a gas-cooled high-temperature reactor is used with at least one heat utilization circuit including a turbine, a compressor and heat exchange apparatus, said tank having a vertically extending cylindrical axis, an upper and a lower end each extending transversely of the cylindrical axis and an outer surface extending approximately concentrically about the cylindrical axis betwen the upper and lower ends, said tank forming a reactor chamber concentric to the cylindrical axis and spaced inwardly from the upper end, the lower end and the vertically extending outer surface of said tank, compartments enclosed within said tank and spaced from said reactor chamber for receiving the components of the heat utilization circuit and connecting piping between the reactor and the components, wherein the improvement comprises that said compartments includes a plurality of horizontally extending first compartments located below said reactor chamber and above the lower end of said tank for receiving a gas turboset, a plurality of vertically extending second compartments arranged in a circle concentric to said cylindrical axis and spaced outwardly from said reactor chamber and inwardly from the vertical outer surface of said tank, a plurality of vertically extending third compartments arranged in a circle concentric to the cylindrical axis of said tank with the circle having a greater diameter than the concentric circle of said second compartments, means for prestressing said tank including vertically disposed tensioning elements extending in the axial direction of said tank and generally horizontally disposed tensioning elements extending transversely of the axial direction, said generally horizontally disposed tensioning elements including first and second horizontally disposed tensioning element with said first tensioning element located approximately at the vertical height of said plurality of first compartments and extending chordally across

said tank in the general direction of the axis of said first compartments, with one said set associated with each of the plurality of said first compartments, said first tensioning elements in each of the sets extending for a major portion of its length along a rectilinear chordal path approximately parallel with the axial direction of said first compartment with which it is associated, and said second tensioning elements encircling said outer surface of said tank above and below the vertical range of said tank in which said at least one first compartment is located.

4,032,403

PROCESS FOR THE PRODUCTION OF SACCHARIFIED STARCH PRODUCTS WHEREIN MALTOSE IS THE PREDOMINANT CONSTITUENT

Shuzo Sakai, and Naoto Tsuyama, both of Okayama, Japan, assignors to Kabushiki-Kaisha Hayashibara Seibutsukagaku Kenkyujo, Okayama, Japan

Filed July 10, 1975, Ser. No. 594,680
Claims priority, application Japan, July 17, 1974, 49-81949; Nov. 7, 1974, 49-128638
Int. Cl.² C12D *13/02*
U.S. Cl. 195—31 R 4 Claims

1. A process for improving maltose purity of saccharified starch products, comprising:

subjecting a starch hydrolysate with a 50% or more maltose purity to the action of an enzyme with a maltotriase decomposing activity versus maltose-decomposing activity ratio of 100 or higher, an optimal pH range from about 5.0 to 7.0, and optimal temperature range from about 45° to 55° C, a stable pH range of about 4.5 to 10.0, a stable temperature range not higher than 55° C, maltotriose decomposing activity several times higher than starch decomposing activity and substantially no dextrinogenic activity.

2. In a process for saccharifying starch products in which starch products are hydrolyzed to a maltose content of 50% or more, the improvement whereby maltose purity is increased, comprising:

subjecting said starch hydrolyzate to the action of an enzyme with a maltotriose-decomposing activity versus maltose-decomposing activity ratio of 100 or higher, an optimal pH range from about 5.0 to 7.0, and optimal temperature range from about 45° to 55° C, a stable pH range of about 4.5 to 10.0, a stable temperature range nto higher than 55° C, maltotriose decomposing activity several times higher than starch decomposing activity and substantially no dextrinogenic activity.

4,032,404

FERMENTATION PROCESS FOR PRODUCING APRAMYCIN AND NEBRAMYCIN FACTOR V'

Koji Tomita, Kawasaki; Hiroshi Tsukiura, Mitaka, and Hiroshi Kawaguchi, Tokyo, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Filed July 14, 1976, Ser. No. 705,210
Int. Cl.² C12D *9/00, 9/14*
U.S. Cl. 195—80 R 22 Claims

1. A microbiological process for the preparation of an aminoglycoside antibiotic mixture comprising apramycin and nebramycin factor V' which comprises cultivating a strain of *Streptoalloteichus hindustanus* having the identifying characteristics of A.T.C.C. 31217, 31218 or 31219 under submerged aerobic conditions in an aqueous medium containing assimilable sources of carbon and nitrogen until a substantial amount of said antibiotic mixture is produced by said organism in said culture medium.

14. A process for the preparation of tobramycin which comprises

a. culturing a nebramycin factor V'-producing strain of *Streptoalloteichus hindustanus* having the identifying characteristics of A.T.C.C. 31217, 31218 or 31219 under submerged aerobic conditions in an aqueous medium containing assimilable sources of carbon and nitrogen until a substantial amount of antibiotic activity is produced by said organism in said culture medium;

b. recovering the antibiotic mixture produced in step (a) from the culture medium;

c. subjecting said antibiotic mixture to base catalyzed hydrolysis to convert the nebramycin factor V' component to tobramycin; and

d. separating tobramycin from the antibiotic mixture of step (c) by chromatography over a cation exchange resin.

4,032,405

METHOD FOR PRODUCING CACAO BUTTER SUBSTITUTE

Chuji Tatsumi, Sakai; Yukio Hashimoto, Izumiotsu; Masahiko Terashima, and Takahal Matsuo, both of Osaka, all of Japan, assignors to Fuji Oil Company, Ltd., Osaka, Japan

Filed Apr. 16, 1976, Ser. No. 677,844
Claims priority, application Japan, Apr. 17, 1975, 50-47253
Int. Cl.² C12D *13/08*
U.S. Cl. 195—82 5 Claims

1. A method for producing a cacao butter substitute, which comprises cultivating a *Rhodosporidium toruloides* microorganism capable of producing fats and oils rich in 1,3-disaturated-2-unsaturated triglycerides under an aerobic condition, collecting the resultant cells, and isolating a mixture containing fats and oils rich in 1,3-disaturated-2-unsaturated triglycerides from the cells.

4,032,406

DOPAMINE-β-HYDROXYLASE DETERMINATION METHOD

Lloyd E. Weeks, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 4, 1975, Ser. No. 637,805
Int. Cl.² G01N *31/14*
U.S. Cl. 195—103.5 R 6 Claims

1. The method of determining dopamine-β-hydroxylase (DβH) activity in blood serum or plasma comprising reacting a sample of said blood serum or plasma with a DβH-specific substrate selected from the group consisting of dopamine and tyramine in the presence of a reaction medium saturated with air or oxygen and comprising ascorbate and fumarate and measuring the uptake of said oxygen with an oxygen-sensing electrode.

4,032,407

TAPERED BED BIOREACTOR

Charles D. Scott, and Charles W. Hancher, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research & Development Administration, Washington, D.C.

Filed Feb. 24, 1976, Ser. No. 660,902
Int. Cl.² C12B *1/00*
U.S. Cl. 195—127 7 Claims

1. An apparatus for carrying out biologically catalyzed reactions, comprising:

a vertically oriented conically-shaped column having an inlet and an outlet disposed from one another along the longitudinal axis of said column, said conically-shaped column diverging at an angle of 0.5°–2° from said axis, said inlet communicating with a section of lesser cross sectional area than said outlet;

a particulate support material within said column; and

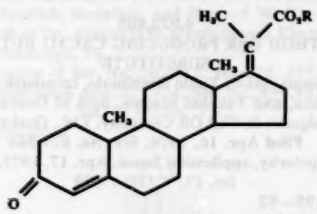
a biological catalyst comprising a living microorganism attached to said particulate support.

4,032,408
PROCESS OF PREPARING 3-OXO-PREGNA-4,17(20)-DIEN-21-CARBOXYLIC ACID AND ESTERS WITH MYCOBACTERIUM

James Jiu, Morton Grove, Ill., and William J. Marsheck, Harbor Beach, Mich., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 573,030, April 30, 1975, Pat. No. 3,994,933. This application Aug. 4, 1976, Ser. No. 711,655
Int. Cl.² C12D 13/02
U.S. Cl. 195—51 S 2 Claims

1. A process for preparing a compound of the formula

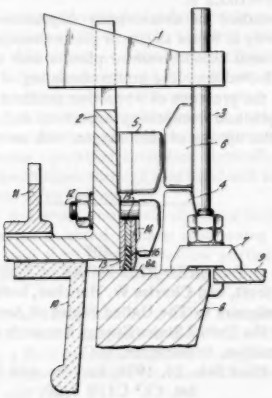


wherein R is hydrogen or methyl comprising fermenting fucosterol, cholesterol, stigmasterol, sitosterol, campesterol and mixtures thereof with Mycobacterium sp. NRRL B-8054 in a suitable growth medium and isolating said compounds.

4,032,409
SEALING DEVICE FOR A COKE OVEN DOOR

Johannes Knappstein, Recklinghausen; Heinrich Tewes, Essen, and Robert Wolkowski, Gelsenkirchen-Horst, all of Germany, assignors to Firma Carl Still and Ruhrkohle AG, both of, Germany

Filed June 11, 1975, Ser. No. 585,819
Claims priority, application Germany, June 14, 1974, 2428698
Int. Cl.³ C10B 25/16
U.S. Cl. 202—248 5 Claims

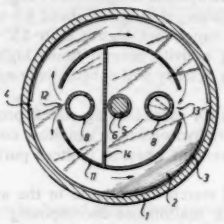


1. A sealing device for sealing a coke oven door to a door frame, comprising first and second spaced apart metal sealing blades having respective substantially aligned sealing edges adapted to extend outwardly from the edge of the door and abut against the frame in sealing engagement, a metal spacer between said first and second sealing blades having an outer edge spaced inwardly from the sealing edges of said first and second sealing blades, clamping means for mounting said first and second sealing blades and said spacer on a coke oven door, and an elastic sealing strip of a mineral fiber between said first and second sealing blades and having an outer elastic sealing edge substantially in alignment with said blade sealing edges and also abutting tightly against said frame in sealing engagement therewith.

4,032,410
DISTILLING COLUMN

Bernhard Kuxdorf, Bruhl; Herbert Plusche, Erftstadt; Heinz Erpenbach, Surth, and Wernfried Riechmann, Bruhl-Vochem, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 20, 1976, Ser. No. 678,651
Claims priority, application Germany, Apr. 26, 1975, 2518661
Int. Cl.² B01D 3/20
U.S. Cl. 202—158 3 Claims

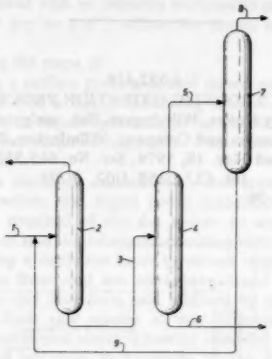


1. A distillation column comprising a vertical elongated housing, said housing having a plurality of serially arranged distilling trays vertically spaced apart from each other therein, said plurality of trays being free of attachments to the inner wall of said housing forming an annular slit between said inner wall and said trays, said plurality of trays being centrally traversed by an aligning rod, said rod being concentrically surrounded by a sleeve between each pair of adjacent trays, each of said trays having a downpipe eccentrically passed therethrough forming a liquid outlet of the accompanying tray and a liquid inlet of the next following tray; distillation column wherein said trays are provided around their peripheries with a plurality of spacers spaced from each other at equal distances around the peripheries of said trays, said spacers bearing against the inner wall of said housing forming said annular slit substantially uniform in width and being interrupted by said spacers; an annular insert arranged concentrically to said rod is secured to each of said trays so as to form a chamber surrounding the liquid inlet and the liquid outlet of the respective tray, said insert having a first aperture in the range of said liquid inlet and a second aperture in the range of said liquid outlet; and a partition plate is asymmetrically secured to the insert dividing said chamber into a first compartment containing the liquid inlet and a second compartment containing the liquid outlet and the aligning rod, whereby the liquid conveyed to each of said trays is forced to flow from the liquid inlet compartment through the first aperture between said insert and the inner wall of said housing thereby to come in contact with vapor matter ascending through said slit, and then through the second aperture into the second compartment to run off via said downpipe.

4,032,411
PROCESS FOR THE PREPARATION OF ETHYLENE DIAMINE HAVING LOW WATER CONTENT

Jan Tore Tornquist, and Karl Goran Dahlberg, both of Stenungsund, Sweden, assignors to Beroi Kemi AB, Stenungsund, Sweden

Continuation-in-part of Ser. No. 448,317, March 5, 1974, abandoned. This application June 13, 1975, Ser. No. 586,780
Claims priority, application Sweden, Mar. 7, 1973, 7303229
Int. Cl.² B01D *3/34*
U.S. Cl. 203—14 9 Claims



1. A process for the removal of water from a mixture of ethylene diamine and water, and for the preparation of ethylene diamine having a water content below the azeotropic equilibrium water content of ethylene diamine and water, which comprises vaporizing off water without formation of any azeotrope from a mixture comprising ethylene diamine, water and a nonazeotroping distillation adjuvant selected from the group consisting of piperazine, diethylene triamine, hydroxyethyl ethylene diamine, aminoethyl piperazine, and mixtures of said adjuvants, in an amount within the weight ratio range from about 2:8 to about 9:1 of distillation adjuvant: ethylene diamine, sufficient to permit vaporization of water from the ethylene diamine without formation of any azeotrope; and then distilling off and recovering as distillate ethylene diamine containing an amount of water less than said azeotropic equilibrium water content.

4,032,412
PROCESS FOR OPTIMAL PRESSURE CONTROL IN A MULTI-STAGE EVAPORATION UNIT

Alfred Hoppe, Frankfurt am Main, and Walter Geistert, Hamburg, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Division of Ser. No. 425,431, Dec. 17, 1973, Pat. No. 3,894,915, which is a continuation of Ser. No. 165,621, July 23, 1971, abandoned. This application Jan. 30, 1975, Ser. No. 545,681
Int. Cl.² B01D *3/42*, *1/26*
U.S. Cl. 203—22 2 Claims

1. A method for controlling pressure of vapor effluent in a high pressure vapor line from a high pressure evaporator to a tank in a multi-stage evaporator unit for increased efficiency thereof comprising,

a. passing a fresh liquid feed in a supply line to a multi-stage evaporator until through a first preheating heat exchanger,

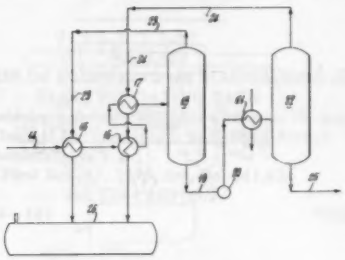
b. passing the fresh liquid feed from the first heat exchanger to a second shell-and-tube heat exchanger in series with the first heat exchanger,

c. passing the fresh liquid feed through the shell of the second heat exchanger,

d. passing the fresh liquid feed from the second heat exchanger to a third shell-and-tube heat exchanger in series with the second heat exchanger,

e. passing the fresh liquid feed through the tubes of the third heat exchanger to the multi-stage evaporator unit,

f. passing the vapor effluent in a high pressure vapor line from the multi-stage evaporator unit first through the shell of the third heat exchanger for condensing a portion of the vapor into a condensate, and



g. passing both the condensate and remaining vapor from the third heat exchanger into the tubes of the shell-and-tube second heat exchanger for condensing the remaining vapor in the latter tubes for increasing resistance to flow in the second heat exchanger for maintaining pressure in the high pressure vapor line and to increase the temperature of the fresh liquid feed to the multi-stage evaporator unit for increased efficiency.

4,032,413
ELECTROPLATING BATH AND METHOD FOR THE ELECTRODEPOSITION OF BRIGHT ALUMINUM COATINGS

Richard Dotzer, Nurnberg; Hans-Georg Hauschildt, Erlangen, both of Germany; Enno Todt, deceased, late of Erlangen, Germany; by Susanne Todt, legal heir, and by Ruth Katharina Todt, legal heir, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 12, 1975, Ser. No. 630,950
Claims priority, application Germany, Nov. 13, 1974, 2453830
Int. Cl.² C25D *3/02*, *3/44*
U.S. Cl. 204—14 N 12 Claims

1. An aluminum electroplating bath comprising an aprotic oxygen- and water-free organo-aluminum electrolyte medium and at least one additive containing a brightener selected from the group consisting of a sulfonamide, sulfonimide, carbimide and mixtures thereof.

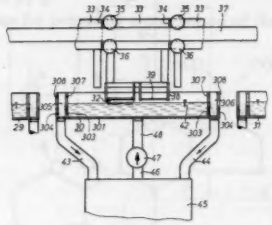
4,032,414
ELECTROPLATING DEVICE AND METHOD FOR THE PARTIAL PLATING OF TWO-ROW PIN STRIPS

Johan Helder, Brugge, Belgium; Karl Holzinger, Munich, Germany; Gerd Guegel, Berlin, Germany; Heinz Liebler, Berlin, Germany, and Wolfgang Pernegger, Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 1, 1975, Ser. No. 636,427
Claims priority, application Germany, Dec. 20, 1974, 2460694
Int. Cl.² C25D *5/02*, *5/08*, *17/06*, *17/28*
U.S. Cl. 204—15 10 Claims

1. In an electroplating device utilizing an electrically conductive contacting and transfer carriage for the detachable positioning and movement of items which are to be electroplated, the device including at least one treatment bath positioned along a line of transit followed by the carriage, the end walls of the treatment bath containing slots for passage of the

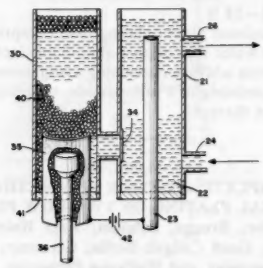
items detachably carried by the carriage, the improvement of said carriages being equipped with electrically conductive enclampment bars adapted to receive two-row pin strips detachably thereon, the carriages being articulated together forming an endless chain moving through a closed loop, electric circuit means in operative contact with the enclampment bars for at least a portion of said loop, an automatic pin strip loading device positioned at one point along said loop, said loading device effective to load pin strips onto said enclampment bars in a position to be treated by said treatment bath upon movement of the carriages around said loop, said pin strips held on said enclampment bars by a friction press fit with the pins on one side of each of the strips in electrically conductive engagement with an enclampment bar and an automatic stripper device positioned at a point along said loop on an opposite side of said treatment bath from said loading device in the direction of movement of the carriages, the stripper device effective to remove pin strips from said enclampment bars.



4,032,415
METHOD FOR PROMOTING REDUCTION OXIDATION OF ELECTROLYTICALLY PRODUCED GAS

Frederick W. Sanders, Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Division of Ser. No. 498,084, Aug. 16, 1974, Pat. No. 3,996,118, which is a division of Ser. No. 252,285, May 11, 1972, Pat. No. 3,849,278. This application Sept. 30, 1976, Ser. No. 728,152
Int. Cl.² C25B 4/02, 1/26
U.S. Cl. 204—78 3 Claims



1. In a method of conducting electrolytic reactions by contacting an anode and cathode with an aqueous electrolyte and imposing a current flow from one electrode to the other through the electrolyte thereby producing chlorine gas at the anode, the improvement comprising:

a. positioning a fixed static bed of solid particles selected from the group consisting of carbon particles, activated carbon particles, and platinized compound particles, in a fixed, static condition adjacent the anode so as to receive the chlorine gas electrolytically produced at the anode,

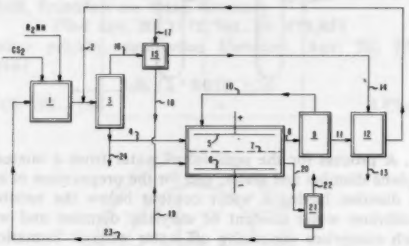
b. introducing a second gas capable of reducing said chlorine gas directly into said fixed static bed of solid particles without disrupting the non-turbulent condition of said fixed static bed, and

c. introducing an aqueous solution into contact with said solid particles, said solid particles being essentially inert with respect to said chlorine gas, said second gas, said aqueous solution, and the reaction product of said reaction and each solid particle being wetproofed by treatment with a substance not wetted by said aqueous solution in order to effectively promote the non-electrolytic reduction of said chlorine gas.

4,032,416
ELECTROLYTIC OXIDATION PROCESS

Leonard Harry Cutler, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 10, 1976, Ser. No. 665,550
Int. Cl.² C25B 3/02, 11/04
U.S. Cl. 204—79 15 Claims



1. A process for the electrolytic oxidation of a dialkyldithiocarbamate to a tetraalkylthiuram disulfide, said process comprising

1. introducing a catholyte and an anolyte to an electrolytic cell divided into a cathode compartment and an anode compartment separated from each other by a cationic membrane capable of resisting migration of hydroxyl ions under process conditions, the active anode surfaces being shiny platinum; the anolyte being an aqueous solution of an alkali metal dialkyldithiocarbamate, and the catholyte being a dilute aqueous alkali solution;
2. connecting the anode and the cathode to a direct current source of a high enough voltage to provide a current density sufficient to effect oxidation of the dialkyldithiocarbamate to tetraalkylthiuram disulfide; and
3. recovering the tetraalkylthiuram disulfide from the anode compartment.

4,032,417
ELECTROLYTIC PROCESSES

John A. Peterson, Niagara Falls, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Sept. 3, 1974, Ser. No. 502,478
Int. Cl.² C25B 1/34, 11/08, 11/10
U.S. Cl. 204—98 10 Claims

1. In a method of electrolyzing aqueous metal chloride solutions, wherein chlorine is liberated at the anode, the improvement consisting essentially of using as said anode, a composite structure comprising a valve metal substrate, a coating thereon of an oxide bronze, and an outer coating of a noble metal oxide selected from the group consisting of an oxide of platinum, iridium, rhodium, palladium, ruthenium, and osmium and mixtures thereof.

4,032,418
METHOD OF INTRODUCING IMPURITIES INTO A SEMICONDUCTOR

Jovan Antula, 19, Trappentreu St., Munich, Germany (D-8000)

Filed July 7, 1975, Ser. No. 593,486
Claims priority, application Germany, Jan. 16, 1975, 2501621
Int. Cl.² C25D *11/00*
U.S. Cl. 204—130 **11 Claims**

1. A method for doping a surface zone of a doped semiconducting material with an impurity material to provide a junction (p-n or p-p⁺or p-n⁺) within the doped semiconductor material

comprising the steps of

contacting a surface portion of said doped semiconducting material with a liquid containing ions of said impurity material, at the temperature of below 60° C to form a doped semiconductor-material - ion containing liquid interface;

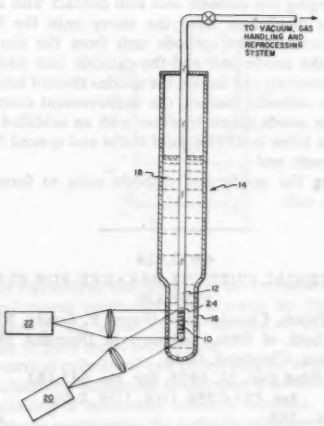
placing an electrode connected to one terminal of a d-c source within said liquid and connecting the opposite polarity terminal of the d-c source to another surface portion of said doped semiconducting material;

and forming a depletion layer to permit migration of ions thereinto from said ion containing liquid through said interface and thus form said junction by applying a d-c voltage from said source to said terminal and hence across said doped semiconducting material - ion-containing liquid interface, said voltage having a polarity and magnitude to form the zone of depleted charge carriers in the semi-conductor material adjacent the surface in contact with the electrolyte and to accelerate said ions from said ion containing liquid into said doped semi-conducting material.

4,032,419
METHOD AND APPARATUS FOR SEPARATING URANIUM ISOTOPES

Elliot R. Bernstein, Princeton, N.J., assignor to Research Corporation, New York, N.Y.

Filed June 11, 1975, Ser. No. 585,809
Int. Cl.² B01J *1/10*
U.S. Cl. 204—157.1 R **14 Claims**

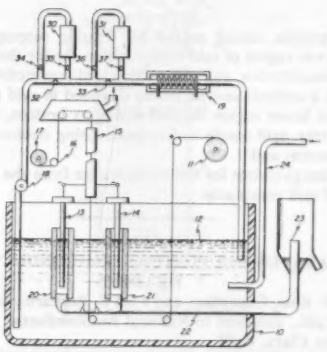


1. A method for separating the uranium-235 isotope-bearing molecules having a first energy excitation level from the uranium-238 isotope-bearing molecules having a second energy excitation level higher or lower than said first excitation energy level in a uranium compound comprising the steps of irradiating said uranium compound in the crystalline form of the solid phase at a first predetermined frequency which excites the uranium-235 isotope-bearing molecules but not the uranium-238 isotope-bearing molecules, and irradiating said uranium compound in the crystalline form of the solid phase with a second radiation source at a second predetermined frequency which dissociates or ionizes the uranium-235 isotope-bearing molecules from said uranium compound in the crystalline form of the solid phase but does not ionize or dissociate the uranium-238 isotope-bearing molecules from said uranium compound.

4,032,420
METHOD OF RESTORING OR MAINTAINING AN ELECTROCOATING BATH

Edith M. Boldebuck, Schenectady, and Catherine W. Joynson, Alplaus, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,624
Int. Cl.² C25D *13/24*
U.S. Cl. 204—181 **7 Claims**



1. A method of restoring a polyamide acid salt electrocoating bath, which is incapable of providing an electrodeposit having at least 15% solids, which has deteriorated over a shelf period of at least several days at ambient temperature, to produce a polyamide acid salt electrocoating composition capable of providing an electrodeposit with greater than 15% by weight solids, or maintaining an electrocoating bath which is being used continuously to electrocoat an aluminum or copper conductor under ambient conditions, which comprises contacting the polyamide acid salt bath with an anion exchange resin for time sufficient to reduce, or maintain the excess non-neutralized carboxylic acid of the polyamide acid salt to less than 0.45 meq of titratable carboxylic acid, per gram of polyamide acid salt, where the anion exchange resin has a cross-link density sufficient to contain from about 50–70% by weight water based on the total weight of water and dry weight of resin.

4,032,421
CLEANING OF FLUE GAS APPARATUS

Claus Fabricius, Allerod, Denmark, assignor to Guldager Electrolyse International & Cie, Basel, Switzerland

Filed Dec. 1, 1975, Ser. No. 636,602
Claims priority, application Denmark, Dec. 3, 1974, 6264/74
Int. Cl.² C23F *13/00*
U.S. Cl. 204—196 **4 Claims**

1. An apparatus for cleaning flue gas comprising:

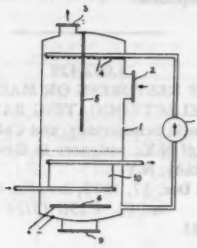
a conductive metal receptacle gas-washer including gas inlet means and gas outlet means establishing a path for flue gas to travel through the receptacle;

a plurality of nozzles arranged within an upper region of

said receptacle in a position for spraying flue gas traveling from said inlet means to said outlet means;

conduit means for providing communication between a lower region of said receptacle and said nozzles;

pumping means provided in said conduit means and operable to transport water from said lower region of said receptacle to said nozzles through said conduit means;



electrolytic circuit means for treating suspensions in the lower region of said receptacle to render the suspensions noncorrosive, and comprising said conductive receptacle as a cathode and an anode disposed in said receptacle at the lower region thereof above its bottom, immersed in water, said anode and cathode being connected to a DC source; and

discharge means for removing sludge from the lower region of said receptacle.

4,032,422

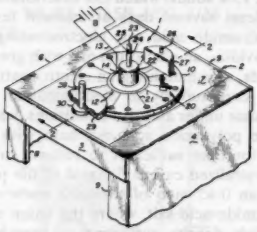
APPARATUS FOR PLATING SEMICONDUCTOR CHIP HEADERS

John P. Ross, Cupertino, and Carl E. Bernardi, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Oct. 3, 1975, Ser. No. 619,368

Int. Cl.² C25D *5/02, 5/08, 17/28*

U.S. Cl. 204—224 R **10 Claims**



1. An apparatus for plating the die-attach areas of a plurality of semiconductor chip headers comprising:

a plurality of cavities, each of said cavities being adapted for supporting one of said plurality of headers in an inverted position therein;

means forming a sealing member disposed in each of said cavities, said sealing member having a central hole, said hole having a diameter corresponding to the diameter of said die-attach areas;

means for clamping headers against said sealing members such that said sealing members provide a fluid-tight seal about said die-attach areas;

means for jetting plating fluid containing a metal through said hole in said sealing members and against said die-attach areas while said headers are clamped against said sealing members; and

means for causing a current to flow between said jetting means and said headers while said plating fluid is being jetted against said die-attach areas for plating said die-attach areas with said metal.

4,032,423

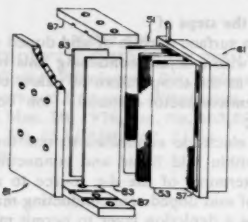
METHOD OF ASSEMBLING A BIPOLAR ELECTROLYZER

Hugh Cunningham, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 9, 1976, Ser. No. 694,505

Int. Cl.² C25B *1/34, 9/02, 13/00, 13/04*

U.S. Cl. 204—254 **11 Claims**



1. In a method of assembling a diaphragm cell having a cathode unit containing a plurality of fingered cathodes, and an anode unit containing a plurality of metal extending outwardly from the anode unit, said method comprising the steps of bringing the cathode unit into contact with a slurry, depositing a diaphragm from the slurry onto the fingered cathodes, removing the cathode unit from the slurry, and assembling the anode unit and the cathode unit whereby to form an electrolytic cell having the anodes thereof interleaves between the cathodes thereof, the improvement comprising:

providing a barrier between a pair of cathodes during diaphragm deposition on said cathodes; and

assembling the anode and cathode units to form a diaphragm cell.

6. In a method of assembling a diaphragm cell having a cathode unit containing a plurality of fingered cathodes, and an anode unit containing a plurality of metal anodes extending outwardly from the anode unit, each of said anodes being formed of a pair of metal sheets, said method comprising the steps of bringing the cathode unit into contact with a slurry, depositing a diaphragm from the slurry onto the fingered cathodes, removing the cathode unit from the slurry, and assembling the anode unit and the cathode unit whereby to form an electrolytic cell having the anodes thereof interleaved between the cathodes thereof, the improvement comprising:

joining the anode sheets together with an acidified sodium chloride brine leachable joint at the end spaced from the anode unit; and

assembling the anode and cathode units to form a diaphragm cell.

4,032,424

ELECTRICAL CURRENT BREAKER FOR FLUID STREAM

Edward J. Peters, Chardon, and Wayne P. Zeman, Richmond Heights, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 22, 1975, Ser. No. 643,182

Int. Cl.² C25B *1/16, 1/26, 9/00*

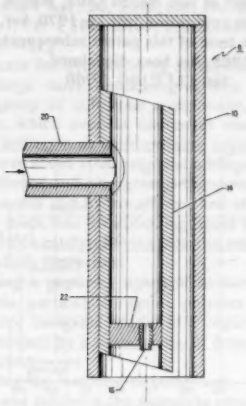
U.S. Cl. 204—258 **4 Claims**

1. Apparatus for interrupting the passage of electrical current along a mixed stream of gas and liquid, which comprises:

a. an outer enclosure;

b. an inner receiver of smaller cross-section supported totally within the outer enclosure for receiving a flow of mixed gas and liquid, having an open top and a closed bottom with an orifice therein;

c. means for introducing a flow of gas and liquid into the inner receiver, whereby the gas and liquid introduced into the inner receiver are allowed to separate, the gas flowing out the open top of the receiver into the outer enclosure



and the liquid flowing out through the orifice where it falls vertically and separates into individual drops;

d. means connected to the outer enclosure for collecting and removing the separated gas and liquid.

4,032,425

ELECTROLYTIC CELL FOR USE IN HYDROELECTROMETALLURGY

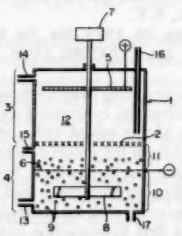
Hiroshi Kametani, Tokyo, Japan, assignor to National Research Institute for Metals, Tokyo, Japan

Filed Sept. 27, 1976, Ser. No. 726,956

Claims priority, application Japan, Sept. 30, 1975, 50-117146

Int. Cl.² C25B 9/00; C25D 17/00; C25C 7/00

U.S. Cl. 204—261 **4 Claims**



1. An electrolytic cell for use in the continuous hydroelectrometallurgical production of a metal by the electrolytic deposition of the metal on the surface of suspended seed particles of pure metal comprising

a. a vertical cylindrical cell comprising an upper anode zone including a horizontal anode and a lower cathode zone including a horizontal network cathode, said network cathode partitioning the cathode zone into an upper and a lower part,

b. a stirrer disposed below said network cathode for agitating the electrolyte to maintain the seed paticles contained therein in a suspended state within said cathode zone,

c. an inlet for charging into the cathode zone the electrolyte and the seed particles on which surface the metal is to be electrolytically deposited from the electrolyte,

d. an outlet for discharging from the anode zone the spent electrolyte,

e. an outlet for discharging and recovering from the cathode zone the enlarged metal particles which have grown by the aforesaid electrolytic deposition of the metal on the surface of the seed particles, and

f. means for passing an electric current between the anode and the network cathode.

4,032,426

ELECTROLYSIS CELLS

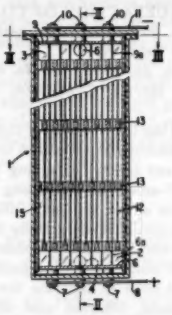
Oronzio de Nora, Milan, Italy; Vittorio de Nora, Nassau, Bahamas, and Placido M. Spaziante, Milan, Italy, assignors to Oronzio de Nora Impianti Elettrochimici S.p.A., Milan, Italy

Filed Oct. 15, 1974, Ser. No. 514,762

Claims priority, application Italy, Oct. 30, 1973, 30709/73

Int. Cl.² C25B 1/24

U.S. Cl. 204—268 **7 Claims**



1. A vertical diaphragmless bipolar electrolyzer comprising a vertical housing provided with a lower electrically neutral electrolyte inlet chamber, an upper electrically neutral electrolyte outlet chamber to keep turbulence within the electrolysis zone to a minimum, a plurality of electrically non-conductive and electrolyte inert divider elements disposed horizontally in the housing and having a cross-section substantially equal to the housing cross-section to form a plurality of chambers therebetween, a plurality of bipolar electrodes passing through said divider elements and being evenly spaced about the housing cross-section with the anode portions and cathode portions extending the same distance from the respective divider elements and interleaved respectively with the cathode portions and anode portions of adjacent groups of electrodes, means in the divider elements allowing smooth upward flow of the electrolyte from one chamber to the next higher chamber and means to impress an electric current on the electrolyzer.

4,032,427

POROUS ANODE SEPARATOR

Igor V. Kadija, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

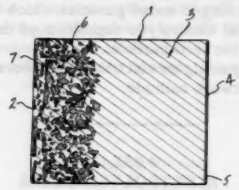
Filed Nov. 3, 1975, Ser. No. 627,995

Int. Cl.² C25B 11/06, 13/04

U.S. Cl. 204—283 **15 Claims**

1. An anode separator comprising a porous plate of a valve metal selected from the group consisting of titanium, tantalum and niobium, said porous plate having a face, a back and an interior structure, said face having an electrochemically active coating selected from the group consisting of a platinum group metal, a platinum group metal oxide and mixtures thereof, said back and a portion of said interior having an electrochemically non-active barrier layer comprising a mixture of an oxide of titanium, tantalum or niobium and a ceramic oxide

selected from the group consisting of silicon oxide, aluminum oxide, magnesium oxide, calcium oxide, and mixtures thereof,



wherein said portion is at least 10 percent of said interior structure.

4,032,428

LIQUEFACTION OF COAL

George C. Johnson, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 28, 1976, Ser. No. 653,070
Int. Cl.² C10G *1/06*
U.S. Cl. 208—8 **6 Claims**

1. In a process for the liquefaction of coal, the improvement which comprises admixing comminuted coal with a thermally stable organic solvent having a boiling point in the range between about 450° and 950° F; heating the admixture at a temperature between about 500° and 900° F for a period of time sufficient to solubilize substantially the coal and form a slurry of a homogeneous liquefaction phase and a solids phase of ash and residual coal; thereafter passing the said slurry through a filter bed zone to separate the liquefaction phase from the solids phase, wherein said filter bed comprises crushed raw coal; and recovering the liquefaction phase as an effluent from the filter bed zone.

4,032,429

COAL LIQUEFACTION PROCESS USING AN ALUMINUM PHOSPHATE SUPPORTED CATALYST

Donald C. Cronauer, Gibsonia, and William L. Kehl, Indiana Township, Allegheny County, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 635,917
Int. Cl.³ C10G *1/08*
U.S. Cl. 208—10 **11 Claims**

1. In a process for the liquefaction of coal in a reaction zone in the presence of a solvent having hydrogen transfer properties and hydrogen and solid supported catalyst containing a hydrogenation component under coal liquefaction conditions, the improvement which comprises utilizing a catalyst support comprising an amorphous aluminum phosphate.

4,032,430

PROCESS FOR PRODUCING CARBON FIBERS FROM MESOPHASE PITCH

Irwin Charles Lewis, Lakewood, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 11, 1973, Ser. No. 423,717
Int. Cl.² C10C *1/00*
U.S. Cl. 208—39 **3 Claims**

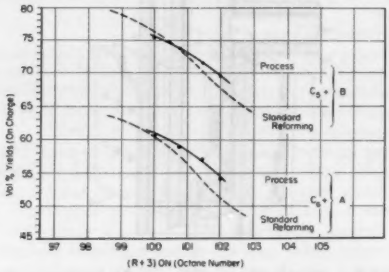
1. A process for producing a mesophase pitch which comprises heating a carbonaceous pitch at a temperature of from 350° to 450° C. for a time sufficient to produce a mesophase content of from 40 percent by weight to 90 percent by weight while subjecting the pitch to a pressure of less than 100 millimeters Hg during formation of the mesophase.

4,032,431

SHAPE SELECTIVE NAPHTHA PROCESSING

Paul B. Weisz, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 747,646, July 25, 1968, abandoned, Continuation-in-part of Ser. No. 547,608, May 4, 1966, Pat. No. 3,395,094. This application July 16, 1970, Ser. No. 66,537
The portion of the term of this patent subsequent to July 30, 1985, has been disclaimed.
Int. Cl.² C10G *37/00*
U.S. Cl. 208—62 **4 Claims**



1. The process for upgrading naphtha so as to produce a product enriched in aromatics which comprises:

a. contacting a charge naphtha in the presence of hydrogen with a reforming catalyst to yield hydrocarbon products;

b. passing hydrocarbon products of said reforming step in admixture with hydrogen in contact with a catalyst mixture comprising:

1. a shape selective crystalline aluminosilicate hydrocracking catalyst having a silica to alumina ratio of at least 3.0, a pore size of about 4.5 to 6 Angstrom units and having hydrogenation/dehydrogenation activity, and

2. a reforming catalyst.

4,032,432

CONVERSIONS OF HYDROCARBONS

Hartley Owen, Belle Mead, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,595
Int. Cl.² C10G *37/06*
U.S. Cl. 208—70 **5 Claims**

1. A method for converting hydrocarbons in the presence of a heterogenous catalyst mix comprising a relatively large pore faujasite crystalline zeolite mixed with a smaller pore crystalline zeolite selected from the group consisting of erionite and mordenite crystalline zeolites which comprises, passing a relarively high boiling hydrocarbon feed of at least gas oil boiling range in admixture with said heterogenous catalyst mix upwardly through a first hydrocarbon conversion zone at an elevated cracking temperature within the range of 900° to 1200° F and a hydrocarbon residence time in the reaction zone up to 15 seconds but sufficient to form hydrocarbon conversion products thereof, separating said catalyst mix from said hydrocarbon conversion products, separating said conversion products into a C_6 and lower boiling fraction, a gasoline fraction and a higher boiling fraction including heavy cycle oil, recovering the separated gasoline and higher boiling fractions, contacting the separated C_6 and lower boiling components with a portion of said heterogenous catalyst mix separated from hydrocarbon conversion products of said first conversion zone at a temperature within the range 550° to 900° F at a space velocity in the range of 0.25 to 13 promoting at least one of olefin oligmerization, polymerization and olefin cyclization, and separately recovering products of said C_6 and lower boiling products upgrading separately from said high boiling hydrocarbon conversion operation.

4,032,433
HYDROREFINING ASPHALTENIC PETROLEUM CHARGE STOCKS

Larry W. Petri, Arlington Heights, and John E. Conway, La Grange, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Apr. 30, 1976, Ser. No. 681,988
Int. Cl.² C10G *13/04*, *23/02*; B01J *35/10*
U.S. Cl. 208—112 **9 Claims**

1. A process for hydrorefining an asphaltenic hydrocarbonaceous charge stock containing at least one contaminant from the group of sulfurous compounds, and nitrogenous compounds, which process comprises reacting said charge stock with hydrogen at hydrorefining conditions including a pressure above about 1000 psig. and a temperature selected to convert sulfurous and nitrogenous compounds into hydrogen sulfide, ammonia and hydrocarbons, and at least a portion of said charge stock into lower-boiling liquid hydrocarbons, and in contact with a catalyst having a carrier material prepared by a method which comprises:

a. admixing a peptizing agent, a surfactant and a water-insoluble, particulate organic polymer with a powdered refractory inorganic oxide, said organic polymer being characterized by a particle size of from about 1 to about 200 microns;
b. extruding the resulting mixture; and,
c. drying and calcining the extrudate product at a temperature effective to decompose said organic polymer.

4,032,434
CONVERSION OF HYDROCARBONS WITH A SUPERACTIVE ACIDIC BIMETALLIC CATALYTIC COMPOSITE

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 423,606, Dec. 10, 1973, Pat. No. 3,948,804. This application Jan. 19, 1976, Ser. No. 650,484
The portion of the term of this patent subsequent to July 10, 1990, has been disclaimed.
Int. Cl.² C10G *35/08*
U.S. Cl. 208—139 **16 Claims**

1. A process for converting a hydrocarbon which comprises contacting the hydrocarbon at hydrocarbon conversion conditions with a catalytic composite comprising a combination of a platinum group component, a tin component and a halogen component with a porous carrier material; werein the metallic components are present in amounts sufficient to result in the composite containing on an elemental basis, about 0.01 to about 2 wt. % platinum group metal and about 0.01 to about 5 wt. % tin; wherein the tin component is uniformly dispersed throughout the porous carrier material in a particle size which is less than 100 Angstroms in maximum dimension; wherein substantially all of the platinum group component is present as an elemental metal; wherein substantially all of the tin component is present in an oxidation state above that of the elemental metal; and wherein the amount of the halogen component, on an elemental basis, contained in the composite is defined by the following equation:

$$\text{wt.\% halogen} = (K_1)(SA) + (K_2)(K_3)(M_{Sn})$$

where

K_1 is about 0.004 to about 0.006 wt. % Halogen/M^2/g
K_2 is about 3 to about 5 atoms of halogen/atoms of tin
K_3 is the gram atomic weight of the halogen
M_{Sn} is moles of tin contained in the composite per 100 g. of composite
SA is the surface area of the carrier material in M^2/g.

4,032,435
HYDRODESULFURIZATION OF PETROLEUM RESIDUUM UTILIZING A CARBON-SUPPORTED CATALYST

Joseph Lawrence Schmitt, Jr., Bethel, and George Augustus Castellion, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

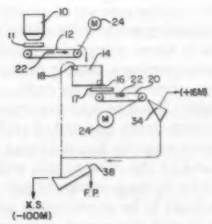
Division of Ser. No. 540,936, Jan. 14, 1975, Pat. No. 3,997,473, which is a continuation-in-part of Ser. No. 408,356, Oct. 23, 1973, abandoned. This application Sept. 22, 1976, Ser. No. 725,599
Int. Cl.² C10G *23/02*
U.S. Cl. 208—216 **5 Claims**

1. A process for the hydrodesulfurization of petroleum residuum comprising contacting said residuum at elevated temperature and pressure with hydrogen in the presence of a catalyst composition consisting essentially of a carbon support carrying at least 10 and up to about 20 weight percent of a first metal selected from tungsten and molybdenum and from about 2 to 10 weight percent of a second metal selected from cobalt and nickel, said percentages being expressed as the metal oxide contents based on the weight of said support and said metals being substantially in the form of their sulfides, said catalyst composition having a surface area in the range of about 200–800 square meters per gram, a pore volume of about 0.25 to 1.3 cubic centimeters per gram so as to base an average pore radius of at least about 25 angstrom units, and a compacted bulk density in the range of about 0.3 to 0.8 gram per cubic centimeter.

4,032,436
PARTICLES SIZING

Kenneth I. Johnson, 19 Torreyside Road, Brockton, Mass. 02401

Filed Oct. 23, 1975, Ser. No. 625,253
Int. Cl.² B07B *1/00*
U.S. Cl. 209—1 **5 Claims**



1. Method of classifying particles of variegated sizing comprising the steps of,

feeding a throughput flow of the particles at a rate (F), divert part of throughput at a rate (G) to a calibrated coarse size selective device and eliminating particles in excess of the calibrated gross size at a first rate (H),

feeding the combination of resultant (G)−(H) flow and (F)−(G) flow to a calibrated fine size selected device at a known rate and eliminating particles below said fine size at a known rate (XS),

and controlling the rates (G) and (XS) for a given rate (F) to achieve a desired sieve analysis and fineness modulus of resultant product flow at a rate of (F)−(H)−(XS) including control of particle sizes at levels intermediate said coarse and fine size calibrations,

the control being implemented in accordance with the finished product describing equation:

$$I = \frac{(N)\,\theta Z + (N-1)\,\theta_2 Z_2 \ldots (N-N+1)\,\theta_N Z_N}{\theta_1 Z_1 + \theta_2 Z_2 \ldots \theta_N Z_N}$$

where t is desired fineness modulus divided by the decimal fraction equivalent, with respect to desired finished product tp, of the remainder after diverting fine size flow (XS), (N) is the number of significant size cuts in the desired sieve analysis, θ, $\theta_2 \ldots \theta_N$ are the decimal fractions of feed of each size in a series starting from coarsest size represented by θ, and finest size by said θ_N and Z_1, $Z_2 \ldots Z_N$ are fractional remainder coefficients of removal at the various sizes.

4,032,437
FECAL EXAMINATION DEVICE

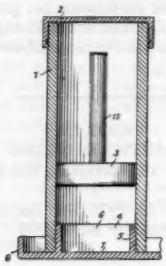
Robert J. Greenwald, 4771 N. Federal Highway, Pompano Beach, Fla. 33064

Continuation-in-part of Ser. No. 150,357, June 7, 1977, abandoned, which is a continuation-in-part of Ser. No. 255,857, May 22, 1972, Pat. No. 3,819,045. This application Mar. 26, 1974, Ser. No. 455,016

The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.

Int. Cl.² B03B 7/00

U.S. Cl. 209—17 **2 Claims**



1. A fecal examining process for detecting the presence of parasite material in feces, comprising providing cup means for receiving and transporting a sample of feces to be examined, providing a tube, open at both its ends, constructed and arranged to be tightly fitted to said cup means so that when so fitted the cup means closes one end of said tube and serves as a base for said tube whereby liquid diluent can then be poured into the other end of the tube to mix with the feces and be retained in the tube by the presence of said cup means, placing a sample of the feces to be examined in said cup means, then fitting said tube to said cup means, pouring liquid diluent into said tube to mix with the feces sample in said cup means, and permitting parasite material to float upward in said tube, through liquid diluent of higher density than said parasite material, to a collecting surface.

4,032,438
METHOD AND APPARATUS FOR ULTRASONICALLY REMOVING CONTAMINANTS FROM WATER

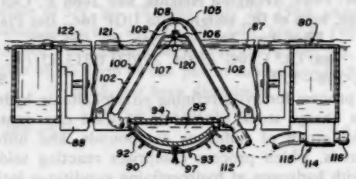
John N. Koblanski, Vancouver, Canada, assignor to Ocean Ecology Ltd., Edmonton, Canada

Filed Sept. 19, 1975, Ser. No. 615,114

Int. Cl.² B01D 37/00

U.S. Cl. 210—19 **9 Claims**

1. A method of removing a contaminating substance floating on a body of water comprising the steps of mounting a transducer having a predetermined focal region on a floating structure, controlling the buoyancy of the floating structure to locate the focal region of the transducer near the interface between the contaminating substance and the surface of the water, electrically energizing the transducer to generate high frequency sound waves radiating upwardly through the water, and entrapping a portion of the contaminating substance



spurted above the surface of the water by the focused sound waves.

4,032,439
EFFLUENT TREATMENT PROCESS

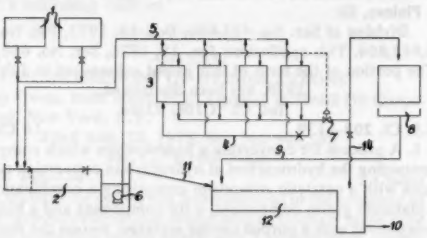
Guy Franklin Oldham, London, England, assignor to The British Petroleum Company Limited, London, England

Continuation of Ser. No. 535,181, Dec. 23, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 668,078

Claims priority, application United Kingdom, Jan. 3, 1974, 00264/74

Int. Cl.² C02C 5/10

U.S. Cl. 210—17 **6 Claims**



1. A method for treating effluent water contaminated with petroleum and petroleum products containing oil and suspended solids to produce a clarified effluent water having a level of oil below about 5 mg/litre and a low level of BOD comprising the following sequential steps:

a. passing said contaminated effluent water to a gravity separator where insoluble oil and solids are separated from the aqueous phase;

b. passing the resulting oil and solids depleted aqueous phase effluent through a sand filter to remove unseparated insoluble oil and solids from the aqueous phase effluent and to obtain a resulting aqueous effluent suitable for effective passage through a biological percolating filter;

c. passing said resulting aqueous effluent through a biological percolating filter to reduce the BOD thereof to the desired low level thereby obtaining said clarified effluent water;

d. periodically stopping the flow of the aqueous phase effluent through the sand filter before insoluble oil passes therethrough and backwashing the sand filter to remove suspended oil therefrom.

4,032,440
SEMIPERMEABLE MEMBRANE

Hirotsugu Yasuda, Durham, N.C., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Nov. 18, 1975, Ser. No. 633,140
Int. Cl.² B01D *31/00, 13/00*
U.S. Cl. 210—23 H **14 Claims**

1. A process for preparation of a composite semipermeable membrane comprising: (1) positioning a porous support in an atmosphere comprising a polymerizable admixture of (a) an organic monomer from the group consisting of acetylene, ethylene, allene, benzene, pyridine and furfurylamine and (b) an inorganic monomer consisting of water or a mixture of water with nitrogen or carbon monoxide, said admixture being in vapor form, and (2) subjecting said admixture to the influence of electromagnetic energy of a frequency of about 50 Hz to 3000 mHz to produce an electric glow discharge, thereby causing copolymerization of the monomers and deposition of the resulting copolymer as a film on the surface of the support.

4,032,441
METHOD FOR RECLAIMING USED HYDRAULIC FLUID

G. Eugene Larkin, 2598 W. 4900 S., Roy, Utah 84067, and Richard H. Buchi, 849 E. 300 South, Bountiful, Utah 84010

Filed June 30, 1976, Ser. No. 701,280
Int. Cl.² B01D *17/02*
U.S. Cl. 210—63 R **1 Claim**

1. A method for reclaiming used and contaminated petroleum base aircraft-operational, hydraulic fluids which consist of the following sequential steps:

a. maintaining said contaminated fluid in a settling reservoir for a period of time sufficient to remove heavy particulate matter.

b. aerating said settled fluid by passing chemically dried air through the fluid;

c. adding an antifoaming agent together with only supplemental amounts of antioxidant, antiwear and corrosion inhibiting agents to said aerated fluid, said amounts being sufficient to reconstitute the fluid such that it possesses substantially the same characteristics as the unused fluid;

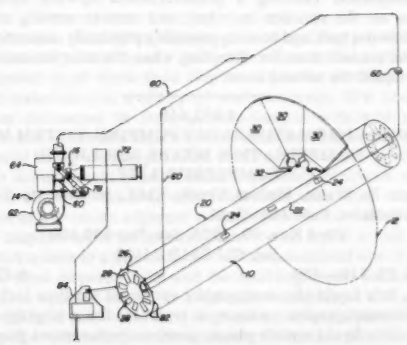
d. filtering fine particulate matter from the aerated fluids; and

e. drawing off the reclaimed hydraulic fluid for distribution to suitable storage containers.

4,032,442
BY-PASS AND SYNCHRONIZED BLOW SYSTEM AND METHOD FOR ROTARY VACUUM FILTERS

C. Lynn Peterson, Salt Lake City, Utah, assignor to Peterson Filters and Engineering Company, Salt Lake City, Utah

Filed Nov. 21, 1975, Ser. No. 633,966
Int. Cl.² B01D *23/24*
U.S. Cl. 210—82 **23 Claims**



1. A rotary vacuum filter of the type having a plurality of filter segments of the drum or the disc type, a continuously rotating face plate with a plurality of circularly positioned ports which are connected through communication passages in a central core member to the filter segments, a stationary blow port in a stationary bridge plate, fixedly mounted in a sliding operative relation to the rotating face plate, such that as the face plate rotates, individual valve ports on the face plate alternately slide past the stationary blow port forming openings of changing size between the face plate and the blow port, and allowing an air stream to be directed from the blow port to the individual valve port, through the communication passages to the filter segment, comprising:

airstream control means for supplying a stream of air from a pressure pumping means directly to the blow port, in a first operative condition of said airstream control means, and, alternatively to the atmosphere in a second operative condition of said airstream control means, and

automatic positioning means for automatically positioning the airstream control means in the first operative condition as soon as the rotating face plate has rotated a valve port in position with the blow port, such that a relatively unrestricted opening exists between the blow port and the valve port, said control means and said automatic positioning means, operatively connected in such a manner as to minimize velocity head losses otherwise caused by permitting the airstream to pass through a relatively restricted opening between the blow port and the valve port.

13. A method of blowing filter segments in a rotary vacuum filter with a relatively constant, high-volume, low-pressure airstream wherein rotation of the rotary vacuum filter causes a periodic opening and closing of valve ports through which communication with filter segments to be blown is achieved, comprising the steps of:

connecting the airstream directly through a valve port after an initial periodic opening through the valve port occurs and at a time when a relatively unrestricted opening through the valve port occurs, disconnecting the airstream relative to the valve port and,

bypassing the airstream to the atmosphere after blowing the filter segments and before the next succeeding blow of any of the filter segments.

17. A system for blowing filter segments of a rotary vacuum filter of the type having a plurality of filter segments of the drum or the disc type, a continuously rotating face plate with a plurality of circularly positioned ports which are connected through communication passages in a central core member to the filter segments, a stationary blow port in a stationary bridge plate, fixedly mounted in a sliding operative relation to the rotating face plate, such that as the face plate rotates, individual valve ports on the face plate alternately slide past the stationary blow port forming openings of changing size between the face plate and the blow port, and allowing an air stream to be directed from the blow port to the individual valve port, through the communication passages to the filter segment, comprising:

a source of compressed air;

an air duct directly connecting the air source to the blow port;

a by-pass means in the air duct for automatically conducting the air from the air source to the atmosphere when open and for allowing the air stream from the air source to be conducted to the blow port when closed,

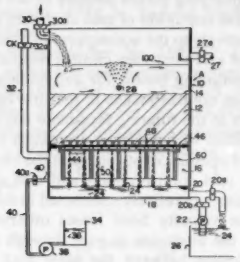
synchronizing means for signaling the occurrence of a relatively unrestricted opening between the blow port and a valve port, and means for causing the by-pass means to assume a closed position upon provision of the signal by the synchronizing means, said by-pass means, said synchronizing means and said means for causing, operatively connected in such a manner as to minimize velocity head losses otherwise caused by permitting the airstream to pass through a relatively restricted opening between the blow port and the valve port.

4,032,443

REMOVAL OF GREASE AND OIL FROM PARTICULATE BED GRANULES BY BACKWASHING WITH A DETERGENT

David S. Ross, Lorain, Ohio, assignor to Sterling Drug Inc., New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,384
Int. Cl.² B01D *23/24*
U.S. Cl. 210—82 19 Claims



1. Apparatus for the removal of grease and oil film from granular media surfaces in waste water filters comprising a filter, said filter includng a tank having a lower portion, a filter bed of particulate material within said tank above said lower portion, said filter bed having an upper surface,

an underdrain structure in the tank adjacent said lower portion and under said bed, an underdrain cavity within said lower portion coextensive with the underdrain structure, means for draining from the underdrain cavity filtered effluent after said filtered effluent has passed through said bed, means for forcing backwashing liquid into the underdrain cavity,

means for forcing a predetermined quantity of cleaning solution into the underdrain cavity.

means to intermittently energize said liquid forcing means to hydraulically disturb said bed of particulate material in contact with cleaning solution,

means to stop said liquid forcing means for a predetermined soak time, and

means to initiate a predetermined backwash cycle following a predetermined number of liquid forcing cycles and respective soak periods.

12. The method of removing oil and grease film from the granular surfaces of particulate media for filtering waste water in a waste filter wherein a filter bed is provided with an underdrain cavity including the steps of

a. forcing a predetermined quantity of a chemical cleaning agent into the underdrain cavity,

b. forcng a backwashing liquid into the underdrain cavity and up through the filter bed to substantially inundate the bed,

c. stopping the flow of backwashing liquid for a predetermined period,

d. hydraulically disturbing said bed of particulate material in contact with said liquid cleaning solution by forcing additional backwashing liquid into said underdrain cavity,

e. stopping the flow of backwashing liquid for a predetermined soaking period,

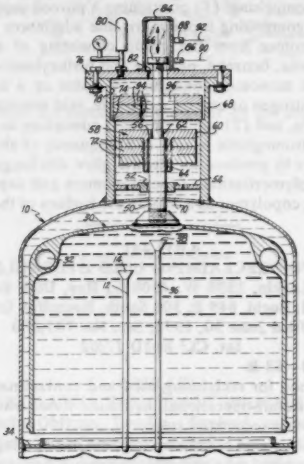
f. and initiating a predetermined backwash cycle following a predetermined number of cycles including steps d and e.

4,032,444

GRAVITATIONAL SEPARATOR FOR MIXTURES OF IMMISCIBLE LIQUIDS OF DIFFERENT DENSITIES

David A. Wright, and Chester H. Walters, both of St. Louis, Mo., assignors to National Marine Service, Inc., St. Louis, Mo.

Filed Aug. 29, 1975, Ser. No. 608,905
Int. Cl.² B01D *17/02*
U.S. Cl. 210—86 11 Claims



1. In a system for detecting the accumulation of a predetermined quantity of less dense fluid within a gravitational separator for immiscible liquids of different densities, including a tank containing a reaction member normally disposed beneath a layer of higher density liquid undergoing separation when the separator is operating and wherein said reaction member is initially counterbalanced to be barely negatively buoyant in the liquid of higher density, said reaction member being normally subjected to the upward floating force of accumulated less dense liquid floating in the more dense liquid during separator operation, the improvement comprising: a housing in communication and assembled with the tank; a first mass of predetermined weight located within the tank and housing assembly, and connected to said reaction member, said first mass contributing at least in part to the negative buoyancy of said reaction member; a second mass of predetermined weight also located within the tank and housing assembly and normally supported from beneath by the separator structure; means for enabling said reaction member to raise said second mass along with said first mass only upon the accumulation of a predetermined quantity of less dense liquid in the tank, such accumulation creating a predetermined upward flotation force on the reaction member; and remote sensing means outside the tank and housing assembly physically unconnected to the second mass for detecting when the reaction member has raised the second mass.

4,032,445

LIQUID CHROMATOGRAPHY PUMPING SYSTEM WITH COMPENSATION MEANS FOR LIQUID COMPRESSIBILITY

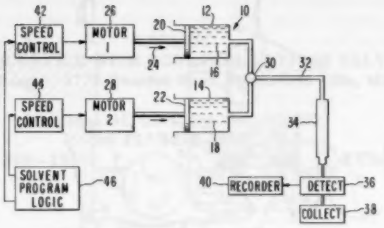
Miner N. Munk, Walnut Creek, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Nov. 10, 1975, Ser. No. 630,400
Int. Cl.² B01D *15/08*
U.S. Cl. 210—103 6 Claims

1. In a liquid chromatography system of the type including a chromatographic column, a reservoir for a slightly compressible liquid mobile phase, positive displacement pumping means cooperating with said reservoir for pumping said liquid phase from said reservoir along a flow path to and through

said chromatographic column, and means for driving said pumping means at a pre-selected velocity; the improvement, which enables maintenance of a constant flow through said column in the presence of a flow resistance change in said column, comprising:

pressure control means in the flow path between said reservoir and said column, said pressure control means comprising means for providing an adjustable flow resistance



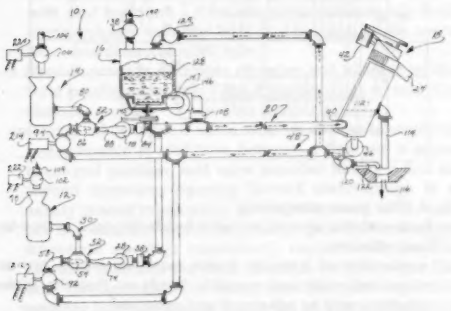
in said flow path, means for detecting the pressure in said flow path, and means responsive to the pressure detected by said pressure detecting means for adjusting the value of said flow resistance so as to maintain a substantially constant pressure at said reservoir, whereby to preclude flow rate changes that would otherwise arise from expansion or contraction of said liquid phase in consequence of the compressibility thereof.

4,032,446

WASTE MATERIAL HANDLING SYSTEM

Blaine Monroe Miller, Jr., Malvern, Pa., assignor to Hobart Corporation, Troy, Ohio

Filed May 5, 1976, Ser. No. 683,475
Int. Cl.² B01D *35/00;* **C02C** *3/00;* **B02C** *23/08*
U.S. Cl. 210—152 **11 Claims**



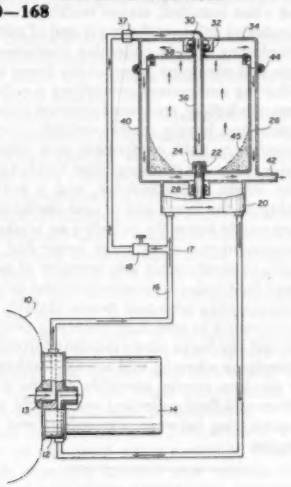
1. A waste material handling system comprising press means for extracting water from a slurry of waste material, a plurality of spaced apart waste food disposer units for forming waste food materials into a slurry of waste material, first conduit means connected in fluid communication with said press means and said waste food disposer units for conducting waste material slurry discharged from each of said waste food disposer units to said press means, a plurality of check valve means each of which is connected with said first conduit means at a location adjacent an associated one of said waste food disposer units for blocking the flow of liquid in said first conduit means in a direction toward the associated one of said waste food disposer units and for enabling liquid to flow in said first conduit means in a direction away from the associated one of said waste food disposer units, and a plurality of slurry flow promoting means connected with said first conduit means at a location adjacent an associated one of said waste food disposer units for promoting a flow of waste material slurry from the associated one of said waste food disposer units to said press means.

4,032,447

OIL CLEANING SYSTEM COMPRISING AN ENGINE BLOCK ADAPTER AND CENTRIFUGAL CLEANING MEANS

Robert J. Douglass, Tolleson, Ariz., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,570
Int. Cl.² F01M *11/02*
U.S. Cl. 210—168 **2 Claims**



1. An oil cleaning system, comprising:

an adapter mounted on an engine block in communication with the oil outlet of said engine block, and a standard oil filter, mounted directly on said adapter,

a pipe connected to the adapter for carrying oil to a valve,

a hydraulic motor connected to the pipe, said motor having means for returning oil through the adapter so as to pass the oil through the standard oil filter,

an oil inlet connected to the valve and passing through a cover into a centrifugal drum, said valve functioning to distribute oil flow from said adapter, between said oil outlet and said hydraulic motor,

the cover sealably mounted to a housing,

means for rotatably supporting an upper end of the centrifugal drum attached to the cover and surrounding the inlet pipe,

a drive shaft extending from the hydraulic motor engaging a bottom surface of the centrifugal drum and supported by a bearing at a bottom of the housing to rotate the centrifugal drum,

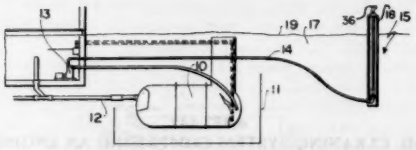
an outlet from the centrifugal drum at an upper surface of the centrifugal drum thereof to permit oil to leave the centrifugal drum and pass along a wall of the housing to an outlet from the housing, and

means of returning the oil to the engine from the outlet from the housing.

4,032,448
SEALED SEWAGE EJECTOR ASSEMBLY

David Martens, Winnipeg, Canada, assignor to D. Marten's Manufacturing Company Ltd., Winnipeg, Canada

Continuation-in-part of Ser. No. 522,050, Nov. 8, 1974, abandoned. This application Dec. 22, 1975, Ser. No. 646,441
Int. Cl.² B01D *21/24*
U.S. Cl. 210—170 12 Claims



1. A sewage effluent ejector assembly connected to a sewage system which includes a septic tank, a pump operatively connected to said septic tank and a conduit extending from said pump to said assembly; said assembly comprising in combinationa standpipe, the upper end of said standpipe being above ground when installed, means sealably connecting the associated conduit to adjacent the lower end of said standpipe, said means including a fluid collecting component sealably secured within said standpipe adjacent the lower end thereof, said fluid collecting component comprising a collector member in the form of a hollow, truncated inverted cone, having an aperture therein and having means sealably connecting the associated conduit to said component and communicating with the interior thereof, a discharge pipe located substantially concentrically within said standpipe, and a sewage ejector nozzle assembly on the lower end of said discharge pipe, said sewage ejector nozzle assembly including an intake lower end, a venturi component and a discharge upper end, said intake lower end being situated within said aperture of said collector member of said fluid collector component and detachably and sealably communicating with said means sealably connecting the associated conduit to said fluid collecting component, the upper end of said discharge pipe extending through the upper end of said standpipe whereby said sewage discharge pipe and said sewage ejection nozzle assembly can be engaged and disengaged from said fluid collecting component, and air entry means communicating between atmosphere and the interior of said standpipe.

4,032,449
SKIMMER FOR A BODY OF LIQUID WITH FLOATING SOLIDS

Erik V. M. De Visser, and Karel I. Ghyselen, both of De Pinte, Belgium, assignors to S.A. Texaco Belgium N.V., Brussels, Belgium

Filed Mar. 24, 1976, Ser. No. 669,775
Int. Cl.² E02B *15/04*
U.S. Cl. 210—173 4 Claims

1. A skimmer for use on a body of liquid subject to having solid matter floating on the surface thereof, comprising in combination

a circular edged weir formed by the upper edge of a funnel immersed in said body of liquid,

means for supporting said funnel with said weir at an adjustable depth beneath the surface of said body of liquid, and

dynamic means for breaking up solids having greater than a predetermined size and tending to be carried over said weir edge, comprising

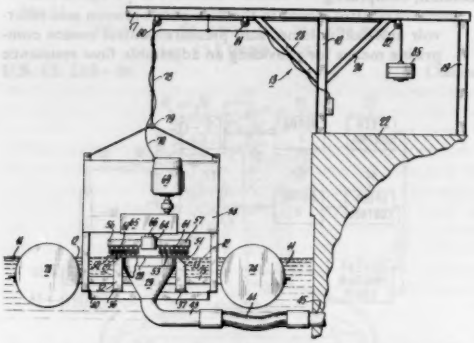
a first set of spaced teeth mounted on a pair of diametrically situated stationary supports relative to said funnel,

said teeth extending vertically upward from said supports,

said supports extending radially relative to said weir edge and being situated adjacent to said surface of the body of liquid, and

a second set of spaced teeth mounted on a complementary pair of diametrically situated rotatable supports extending radially in a concentric manner relative to said first set supports,

said second set of teeth extending vertically downward and radially between said first set, and

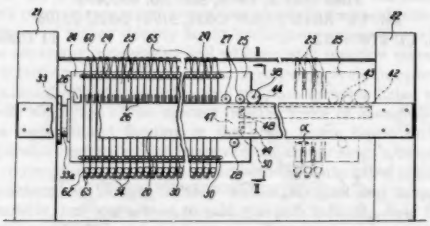


conduit means connected to the bottom of said funnel for carrying off the skimmed fluids.

4,032,450
FILTER PRESS

Akitoshi Iwatani, Marugame, Japan, assignor to Ishigaki Kiko Co., Ltd., Tokyo, Japan

Filed July 17, 1975, Ser. No. 596,613
Claims priority, application Japan, Dec. 24, 1974, 49-2478; Jan. 27, 1975, 50-11756
Int. Cl.² B01D *25/00*
U.S. Cl. 210—230 2 Claims



1. A filter press comprising:

a. front and rear spaced movable heads disposed in face-to-face relation;

b. a plurality of movable frame members which are arranged between said movable heads so that the frame members may be advanced and retracted;

c. connecting means for connecting said movable frame members and movable heads so that the frame members may be separted to give definite intervals therebetween;

d. at least one filter cloth disposed between each two adjacent movable frame members and supported so that the cloth may be moved;

e. driving means for moving said filter cloth;

f. hydraulic cylinder means associated with one of said movable heads so that the said movable head may be advanced and retracted for tightening and separating said movable frame members;

g. driving means for advancing and retracting the other movable head between a most retracted position and a predetermined advanced position; and

h. restraining means for releasably restraining said other movable head at said predetermined advanced position, said restraining means including at least one fixed stopper means fixedly arranged laterally outwardly of said movable frame members and at least one movable stopper

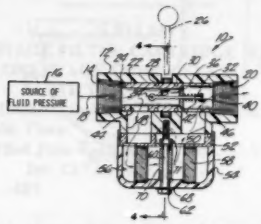
means which is supported by said other movable head so that it may be moved laterally outwardly from the movable frame members so as to engage said fixed stopper means.

4,032,451

FILTER DEVICE WITH ROTATABLE BYPASS VALVE

Nils O. Rossen, 3774 Quarton Road, Bloomfield Hills, Mich. 48013

Filed Mar. 31, 1975, Ser. No. 563,802
Int. Cl.² B01D 29/00
U.S. Cl. 210—232 5 Claims



1. A fluid filter device comprising:

body means having a cylindrical bore formed therethrough wherein one axial end of said bore forms the fluid inlet for the device while the other axial end of said bore forms the fluid outlet for the device,

said body means having a filter chamber, said filter chamber having a filter chamber inlet which fluidly communicates with said bore and a filter chamber outlet which fluidly communicates with said bore at a position axially spaced from said filter chamber inlet,

a filter disposed in said filter chamber and adapted to filter fluid passing from said filter chamber inlet to said filter chamber outlet;

an elongated cylindrical valve member disposed in said bore and rotatable in said bore between a first and a second rotational position, said valve member having a first and second transverse opening formed therethrough in an axially spaced relationship so that when said valve member is in said first rotational position, said first and second transverse openings respectively register with the filter chamber inlet and the filter chamber outlet to open fluid flow through said filter chamber while when said valve member is in said second rotational position said first and second transverse openings are out of registration with said filter chamber inlet and filter chamber outlet to close fluid flow through said filter chamber,

a handle secured to and extending transversely from said valve member at a point intermediate said first and second transverse openings for rotating said valve member between said first and said second rotational positions,

said body means including a body and a cover member disposed on the body to form said filter chamber, fastener means threadably mounted on the body and connected to the cover to ordinarily prevent its removal from the body, the fastener means being removable from the body in a motion in which the fastener means engages the cover to remove it from the body, and

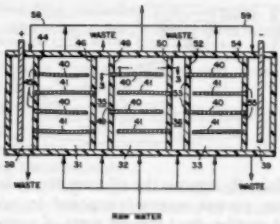
the cover member having an opening for receiving the fastener means, the cover opening being slightly larger than the fastener means to permit air flow through said cover opening into the filter chamber when said fastener means is being removed from said body.

4,032,452

ELECTRICALLY REGENERATED ION EXCHANGE SYSTEM

Thomas A. Davis, Vestavia Hills, Ala., assignor to Sybron Corporation, Rochester, N.J.

Filed Nov. 13, 1975, Ser. No. 631,841
Int. Cl.² B01D 57/00
U.S. Cl. 210—243 17 Claims



14. An electrically regenerated ion exchange system comprising:

an anode compartment and a cathode compartment;

a first demineralization compartment positioned intermediate said anode and cathode compartments and adjacent to said anode compartment;

a second demineralization compartment positioned intermediate said anode compartment and said cathode compartment and adjacent to said cathode compartment;

at least one waste compartment between said first and said second demineralization compartments;

said first demineralization compartment containing a plurality of elongated cation exchange members having first ends extending towards said anode compartment and second ends exposed to a waste compartment positioned between said first and second demineralization compartments and adjacent to said first demineralization compartment, and a plurality of elongated anion exchange members having first ends that are exposed to said anode compartment and second ends that extend towards but are not exposed to said waste compartment adjacent to said first demineralization compartment;

said second demineralization compartment containing a plurality of elongated anion exchange members having first ends extending towards said cathode compartment and second ends exposed to a waste compartment positioned between said first and second demineralization compartments and adjacent to said second demineralization compartment, and a plurality of elongated cation exchange members having first ends that are exposed to said cathode compartment and second ends that extend towards but are not exposed to said waste compartment adjacent to said second demineralization compartment.

4,032,453

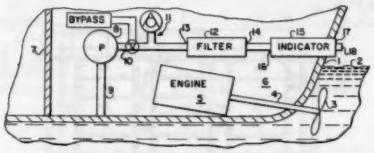
OIL-WATER SEPARATOR

Vito S. Pedone, Box 2733, Arlington, Va. 22202

Division of Ser. No. 492,168, July 26, 1974, Pat. No. 3,913,513. This application May 15, 1975, Ser. No. 577,895
Int. Cl.² B01D 39/04
U.S. Cl. 210—266 7 Claims

1. A filter for removing oil from water and discharging filtered water free from oil, comprising: a housing having an inlet and an outlet for the liquid; fluid distribution means within said housing for directing the fluid along a predetermined path between said inlet and said outlet; filter particles substantially completely filling said housing; a first mass of said particles, within said housing and in said path, having a size within a predetermined range and being of an expanded open pore oleophilic and hydrophobic rigid synthetic resin; a second mass of said particles, within said housing and in said

path spaced in the direction of flow from said first mass, of a size within a range substantially less than the range of said first mass of particles, and being of expanded open pore olephilic and hydrophobic rigid synthetic resin; said smaller sized second mass of particles being interposed within said path between said larger sized particles and said outlet, so that said larger sized mass of particles will constitute means to distribute the fluid transversely of the path for even distribution and said smaller sized second mass of particles will constitute



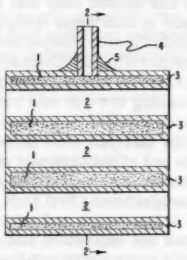
means to efficiently remove the oil from the water while passing the water; porous means interposed in said fluid path between said smaller sized second mass of particles and said discharge means with a plurality of through passages smaller than said smaller sized particle range of said second mass for passing the filtered water and blocking the passage of said smaller sized particles; and the particles of each of said first and second masses contain cut and uncut expanded resin cells, with the uncut cells being generally spherical and the cut cells being generally truncated spheres with undistorted open ends.

4,032,454

PERMSELECTIVE MEMBRANE APPARATUS WITH POROUS SUPPORT

Fred Wayne Hoover, Wilmington, Del., and Robert Earl Roberts, Kennet Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 31, 1972, Ser. No. 240,260
Int. Cl.² B01D *31/00*
U.S. Cl. 210—323 R **10 Claims**



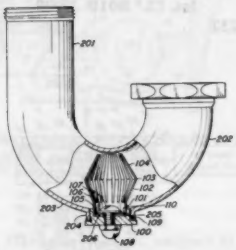
1. Apparatus for separating the components of a fluid mixture by means of pressure and a permselective membrane, which apparatus comprises
a fluid-tight shell having
a fluid feed inlet,
a fluid concentrate outlet, and
a permeate outlet,
and containing at least one element spaced away from the interior surface of the shell, said element comprising
a body
of porous material
with multiple passages therethrough,
a membrane
selectively permeable to the components of the fluid mixture and supported by at least a portion of the surface of the passages,
a conduit
in fluid communication with the porous body and the permeate outlet and in fluid-tight relation to the membrane, and
a non-permeable coating on all surfaces of the porous body not supporting the membrane or providing fluid communication between the porous body and the conduit.

4,032,455

TRAPS FOR SINKS, LAUNDRY TUBS AND THE LIKE

Howard D. Kale, 6529 Gulfside Drive, Longboat Key, Fla. 33577

Filed June 14, 1976, Ser. No. 696,071
Int. Cl.² B01D *29/36*
U.S. Cl. 210—435 **3 Claims**



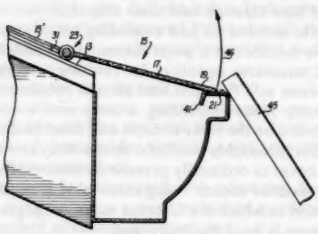
1. A blocking member for a trap for use in connection with sinks, laundry tubs and the like, said trap having a dip portion with the bottom wall of said dip portion having an opening, and a plug for closing said opening; said blocking member comprising a supporting toroid adapted to be received by said plug, plurality of flexible fingers vertically depending from and held in spaced apart relationship on said toroid each of said flexible fingers tapering outwardly from said supporting toroid to a point chosen such that corresponding positions on said plurality of flexible fingers define a circle having a diameter corresponding approximately to the interior diameter of a trap and tapering inwardly from that point to a dimension such that the tips of the plurality of flexible fingers in combination define a second circle having a diameter approximately equal to the diameter of said supporting toroid, and means for attaching said blocking means to said plug.

4,032,456

FLIP-UP GUTTER SHIELD

William E. Berce, 2703 Westmoreland Road, Charlottesville, Va. 22901

Filed Feb. 26, 1976, Ser. No. 659,056
Int. Cl.² B01D *23/00*; E04D *13/04*
U.S. Cl. 210—474 **11 Claims**



1. A gutter shield of the type comprising an elongated mesh cover positionable over a gutter, said mesh cover having a first side adjacent and parallel to a roof and a second side adjacent

and parallel to the outer edge of said gutter, said gutter shield further comprising:

hinge means attached to said first side of said mesh cover and fixed to said roof such that said mesh cover may be swung from a first position covering said gutter to a second position away from said gutter, said mesh cover being totally independent of said gutter in said second position, thereby permitting servicing of said gutter without interference from said mesh cover; and

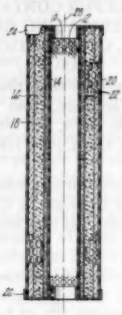
guide means attached to and extending from said second side of said mesh cover, said guide means extending adjacent said outer edge of said gutter and comprising a plurality of needle-like projections extending downward from said second side of said mesh cover to serve as position guide means for said second side of said mesh cover, such that said second side is positioned over but not beyond said outer edge, thereby permitting the positioning of a ladder against said gutter without interfering with the movement of said mesh cover.

4,032,457

PLURAL STAGE FILTER CARTRIDGE WHEREIN AT LEAST ONE STAGE COMPRISES PULVERIZED PARTICULATE MATERIAL

Robert W. Matchett, Suffield, Conn., assignor to Fibredyne, Inc., Suffield, Conn.

Filed June 4, 1975, Ser. No. 583,749
Int. Cl.² B01D *25/04, 25/16*
U.S. Cl. 210—489 **18 Claims**



1. A multiple phase filter cartridge including:

a first fibrous filtering stage, said first filtering stage being of substantially constant thickness throughout the length thereof;

at least a second fibrous filtering stage surrounding said first stage, said second filtering stage being of substantially constant thickness throughout the length thereof, said first and second fibrous filtering stages serving as successive filtering phases for fluid passing through said first and second filtering stages with said second stage being upstream of said first stage in the direction of fluid flow through the filter cartridge, said second filtering stage including fibrous material of fiber diameter greater than the fiber diameter of the fibrous material of said first filtering stage, said second filtering stage having greater permeability when compared to said first filtering stage and having a specific gravity sufficiently low to enable depth filtration therethrough, said fibrous material of said first filtering stage ranging in diameter from 0.1 to 25 microns and said fibrous material of said second filtering stage ranging in diameter from 5 to 100 microns;

the fibers of each of said filtering stages being selected from the group consisting of up to 50% cellulose fibers, 20% to 90% polymer fibers and 10 to 30% glass fibers;

discrete particles of pulverized chemically active material of 40 mesh or smaller in size, dispersed throughout one of said filtering stages; said particles being bonded to said fibers by a resin binder; the weight of said binder not exceeding 10 wt. % relative to the weight of said fibers of said one stage,

each of said stages being of sufficient thickness such as to enable fluid flow in an essentially normal direction through the combined stages; and

a discharge flow passage in said filter cartridge to receive and discharge fluid after passing through said filtering stages.

13. An inline filter including:

casing means having axially aligned fluid inlets and outlets; and

a multiple phase filter cartridge in said casing means, said filter cartridge including:

at least first and second fibrous filtering stages within said casing means, said first and second fibrous filtering stages serving as successive filtering phases for fluid passing therethrough;

said first filtering stage including an annular layer of substantially constant thickness of fibrous material of fiber diameter less than the fiber diameter of the fibrous material of said second filtering stage and being of lesser permeability than the second filtering stage;

said second filtering stage surrounding said first filtering stage and including an annular layer of substantially constant thickness of fibrous material of fiber diameter greater that the fiber diameter of the fibrous material of the first filtering stage and being of lower permeability than said first filtering stage and having a specific gravity sufficiently low to enable depth filtration therethrough, said second filtering stage being upstream in the direction of fluid flow from said first filter stage;

said fibrous material of said first filtering stage ranging in diameter from 0.1 to 25 microns and said fibrous material of said second filtering stage ranging in diameter from 5 to 100 microns;

the fibers of each of said filtering stages being selected from the group consisting of up to 50% cellulose fibers, 20 to 90% polymer fibers, and 10 to 30% glass fibers;

each of said filtering stages being of sufficient thickness such as to enable fluid flow in an essentially normal direction to the combined stages;

one of said filtering stages having discrete particles of pulverized chemically active material of 40 mesh smaller in size, disbursed throughout said one filtering stage; said particles being bonded to said fibers by a resin binder; the weight of said binder not exceeding 10 wt. % relative to the weight of said fibers of said one stage,

a central flow passage in said filter cartridge to receive and discharge fluid after passing through said filtering stage; and

means connecting said central flow passage to said outlet of said casing means.

4,032,458

PRODUCTION OF 1,4-BUTANEDIOL

Stone D. Cooley, Houston; Robert P. Arganbright, Seabrook; William G. Bowman, Pasadena, and James D. Henery, Houston, all of Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Aug. 8, 1975, Ser. No. 602,993
Int. Cl.² C07C *29/00*
U.S. Cl. 260—635 D **5 Claims**

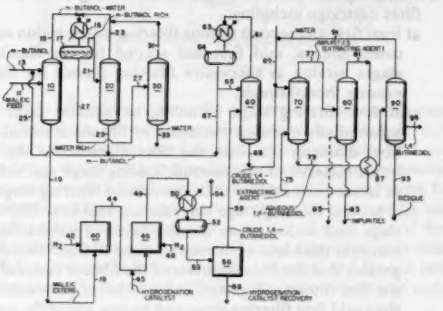
1. A process for the production of 1,4-butanediol from a maleic acid-containing feedstock, which process comprises the steps of:

a. contacting the maleic acid-containing feedstock with a monohydric alkanol having from 2 to about 10 carbon atoms in an esterification-dehydration zone comprising a pressure distillation column wherein the maleic acid-containing feedstock is distilled in the presence of the monohydric alkanol thereby forming an overhead vapor prod-

uct comprising an azeotrope of water and the monohydric alkanol and a bottoms product having an acid number of 1.0 mg KOH/g. or less comprising the monohydric alkanol and the dialkyl ester of maleic acid,

b. contacting the bottoms product from the esterification-dehydration zone with hydrogen at elevated temperature and pressure in the presence of a copper chromite hydrogenation catalyst in a first hydrogenation zone thereby to hydrogenate the ethylenic unsaturation present in the bottoms product from the distillation zone,

c. contacting the product from the first hydrogenation zone in a second hydrogenation zone with hydrogen in the presence of a copper chromite hydrogenation catalyst



thereby to reduce the dialkyl esters to a product comprising 1,4-butanediol and monohydric alkanol,

d. introducing the product from the second hydrogenation zone to a catalyst recovery zone wherein the copper chromite hydrogenation catalyst is recovered,

e. introducing the product obtained from the catalyst recovery zone to a light ends recovery zone wherein there is recovered an overhead product comprising the monohydric alkanol and the more volatile impurities and a bottoms product comprising crude 1,4-butanediol and the less volatile impurities, and recovering 1,4-butanediol from said bottoms product of the light ends recovery zone.

4,032,459

LUBRICATING COMPOSITIONS CONTAINING HYDROGENATED BUTADIENE-ISOPRENE COPOLYMERS

Ronald K. Crossland, and David J. St. Clair, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 29, 1976, Ser. No. 653,330

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.² C10M *1/32*

U.S. Cl. 252—51.5 A **8 Claims**

1. An improved lubricating oil composition comprising a major proportion of a hydrocarbon lubricating oil, a pour point depressing amount of a pour point depressant, and a viscosity index improving amount of a viscosity index improver, the improvement wherein said viscosity index improver comprises a hydrogenated copolymer of butadiene and isoprene wherein the weight ratio of butadiene to isoprene is between about 10:90 and 70:30 and from about 20 to about 55% of the precursor copolymer units are in the 1,4-configuration and wherein the olefinic bonds are substantially saturated during hydrogenation, the average molecular weight being between about 40,000 and about 225,000.

4,032,460

INHIBITION OF SCALE DEPOSITION IN HIGH TEMPERATURE WELLS

Horst E. Zilch, Yorba Linda, and Paul W. Fischer, Whittier, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Oct. 28, 1975, Ser. No. 625,814

Int. Cl.² C02B *5/06*; C23F *15/00*

U.S. Cl. 252—8.55 B **10 Claims**

1. A method for inhibiting the formation of scale from hot aqueous fluids having a temperature of about 400° F. and above, which comprises adding to the hot aqueous fluid a scale-inhibiting amount of a scale inhibitor comprising a water-soluble organic compound selected from the group consisting of thiourea, hexamethylenetetramine, dimethylsuccinate and the amide reaction products of unsubstituted saturated aliphatic dicarboxylic acids containing from about 2 to about 10 carbon atoms tartaric acid, or citric acid with unsubstituted saturated aliphatic primary and secondary amines having from about 2 to about 8 carbon atoms, propane- (1,3) -diamine, 3-dimethylaminopropylamine, 3-diethylaminopropylamine, hydroxylated amine derivatives selected from the group consisting of monoethanolamine, diethanolamine, and aminoethanolamine or saturated nitrogen-containing heterocyclic compounds selected from the group consisting of piperidine, pyrrolidine, piperazine, morpholine and 2,6-dimethylmorpholine.

4,032,461

PHOSPHORUS AND SULFUR CONTAINING AMIDES AND THIOAMIDES AS LUBRICATING OIL ADDITIVES AND LUBRICATING OIL COMPOSITIONS CONTAINING SAME

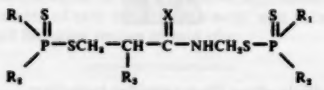
Donald Irvin Hoke, Chagrin Falls, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Filed Sept. 6, 1974, Ser. No. 503,892

Int. Cl.² C10M *1/48*

U.S. Cl. 252—46.7 **28 Claims**

1. A lubricating composition comprising a major proportion of a lubricating oil and from about 0.1% to about 20% by weight of the composition of at least one additive corresponding to the formula:



wherein each R_1 and R_2 is, independently, a member selected from the group consisting of hydrocarbyl, hydrocarbyloxy and hydrocarbylthio; R_3 is a member selected from the group consisting of hydrogen, halogen, lower alkyl, halogen substituted lower alkyl, lower alkoxy substituted lower alkyl, lower alkylthio substituted lower alkyl, nitro-substituted lower alkyl, hydroxy-substituted lower alkyl and mercapto-substituted lower alkyl; and X is a member selected from the group consisting of oxygen and sulfur.

4,032,462

LUBRICATING OIL ADDITIVE COMPOSITION

Bruce W. Hotten, Orinda, and John M. King, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed May 24, 1976, Ser. No. 689,615

Int. Cl.² C10M *1/38*, *1/54*

U.S. Cl. 252—49.7 **10 Claims**

1. An additive composition for use in lubricating oils comprising:

1. an oil-soluble antioxidant selected from sterically hindered phenols and thiophenols, aromatic amines and

2. an oil-soluble antimony compound of the formula

$(R)_3Sb$ or $(R)_3Sb \rightarrow X$

wherein each R is independently hydrocarbyl and X is oxygen or sulfur.

4,032,463

LIQUID DEVELOPER FOR USE IN ELECTROSTATIC PHOTOGRAPHY AND PREPARATION OF SAME

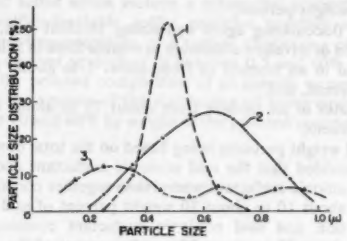
Toshiyuki Kawanishi, and Norimasa Sohmiya, both of Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan

Continuation-in-part of Ser. No. 436,638, Jan. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 328,964, Feb. 2, 1973, abandoned. This application Apr. 12, 1976, Ser. No. 676,055

Claims priority, application Japan, Feb. 4, 1972, 47-12189

Int. Cl.[2] G03G 9/12

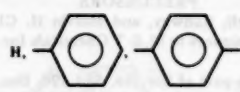
U.S. Cl. 252—62.1 L 5 Claims



1. A liquid developer for use in electrostatic photography comprising toner particles dispersed in a petroleum aliphatic hydrocarbon solvent having a solubility parameter of from 7.0 to 7.5; said toners having a mean particle size of from 0.2 to 0.8 μ, and a particle size distribution such that about 90% of the particles are in the particle size range of from 0.3 to 0.6 μ; said toners comprising at least one pigment together with a mixture of Polymer A and Copolymer B, Polymer A having a molecular weight of from 10,000 to 200,000, Copolymer B having a molecular weight of from 5,000 to 30,000 and a solubility parameter of from 7.5 to 8.7, the weight ratio of Polymer A to Copolymer B being from 0.1:1–20:1, said Polymer A being a homopolymer or a copolymer containing monomers represented by the general formula

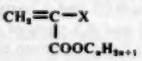
I:

wherein X represents H or CH_3, and Y represents



COOH, $COOC_nH_{2n+1}$ (wherein n is an integer ranging from 9 to 20), $-CH=CH_2$;

said Copolymer B containing monomers represented by the general formulas

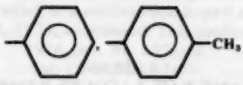


II:

wherein X represents H or CH_3, and n is an integer ranging from 6 to 20; and

III:

wherein X represents H or CH_3, and Z represents



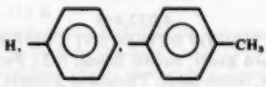
or $COOC_nH_{2n+1}$ (wherein n is an integer ranging from 1 to 5); the molar ratio of Formula III/Formula II being 50–95:50–5.

3. A process for the production of a liquid developer containing dispersed toner particles having a mean particle size of from 0.2 to 0.8 μ, and a particle size distribution such that about 90% of the particles are in the size range of from 0.3 to 0.6 μ for use in electrostatic photography which comprises the steps of:

1. Mixing a pigment and a Polymer, A, in a solvent having a solubility parameter of from 7.0 to 7.5 being a petroleum aliphatic hydrocarbon solvent containing up to 25% by weight of an aromatic hydrocarbon, said Polymer A having a molecular weight of from 10,000 to 200,000 and being a homopolymer or a copolymer containing monomers represented by the general formula

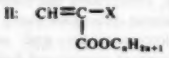
I:

wherein X represents H or CH_3, and Y represents



COOH, $COOC_nH_{2n+1}$ (wherein n is an integer ranging from 9 to 20), $-CH=CH_2$, the weight ratio of pigment to solvent to Polymer A being 3-15:55-95:1-30;

2. Mixing the product of Step 1 with Copolymer B, said Copolymer B having a molecular weight of from 5,000 to 30,000 and a solubility parameter from 7.5 to 8.7, the weight ratio of Polymer A to Copolymer B being from 0.1:1–20:1, said Copolymer B containing monomers represented by the general formulas

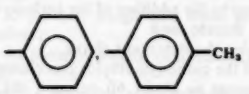


II:

wherein X represents H or CH_3, and n is an integer ranging from 6 to 20; and

III:

wherein X represents H or CH_3, and Z represents



or $COOC_nH_{2n+1}$ (wherein n is an integer ranging from 1 to 5), the molar ratio of Formula III/Formula II being 50–95:50–5, and

3. Dispersing the product from Step 2 in a petroleum aliphatic hydrocarbon solvent having a solubility parameter of from 7.0 to 7.5.

4,032,464

CREAMY NAIL LACQUER REMOVER

Jack J. Mausner, East Hills, N.Y., assignor to Helena Rubinstein, Inc., New York, N.Y.

Filed Jan. 14, 1976, Ser. No. 649,195
Int. Cl.² C11D *1/32, 3/43, 3/48*
U.S. Cl. 252—89 R 5 Claims

1. A creamy composition for removing nail lacquer consisting essentially of at least about 0.01% by weight of a chelating agent selected from the group consisting of the disodium salt of ethylene diamine tetraacetic acid and calcium sodium diacetate, about 1.0% by weight of propylene glycol or glycerine humectant, 0.1% by weight of 2-hydroxy-4-methoxy-benzophenone-5-sulfonic acid, 0.05% by weight of a collagen-derived protein-fatty acid condensation product, about 0.05% by weight of the palmitate of vitamins A and D, and about 0.5% by weight of a carboxy vinyl polymer dispersed in about 70–90% by weight of acetone thickened with a thickening agent selected from the group consisting of methyl cellulose, ethyl cellulose, gum arabic and a hydroxypropyl cellulose and neutralized with about 0.2–1.0% by weight of triamylamine.

4,032,465

PRODUCTION OF DETERGENT COMPOSITIONS

Herbert Edward Bauer, Saddle Brook, N.J.; Bertus Goossens, Vlaardinger, Netherlands; Theodorus Joannes Kock, Heenvliet, Netherlands, and Johannes Laurentius Cornelis Manders, Roosendaal, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,946
Claims priority, application United Kingdom, Feb. 3, 1975, 4547/75
Int. Cl.² C11D *11/02, 3/06*
U.S. Cl. 252—135 15 Claims

1. A process for making a spray dried powdered detergent composition containing a carboxymethyloxysuccinate salt detergency builder, at least one detergent compound and an alkali metal silicate, comprising the steps of,

a. forming an aqueous detergent slurry containing dispersed carboxymethyloxysuccinate and said detergent compound said detergent compound being selected from the group consisting of anionic, nonionic, zwitterionic and amphoteric detergents;

b. adding alkali metal silicate to the aqueous slurry after the addition thereto of the carboxymethyloxysuccinate salt, wherein the alkali metal oxide to silicon dioxide ratio of said silicate is about 1:1 to about 1:2.5;

c. maintaining the water content of the slurry at not less than about 40 percent by weight of the final slurry formulation;

d. maintaining the slurry temperature at not less than 76° C subsequent to the addition of the carboxymethyloxysuccinate salt thereto; and

e.spray drying the detergent slurry,

the amount of the carboxymethyloxysuccinate salt being from about 10 percent to about 60 percent, the amount of the detergent compound being about 5 percent to about 40 percent and the amount of the alkali metal silicate being about 3 percent to about 12 percent by weight of the final detergent composition.

4,032,466

ACID CLEANER AND PROCESS FOR DISPOSAL THEREOF

Joseph V. Otrhalek, Dearborn; Gilbert S. Gomes, Southgate, and Robert E. Gansser, Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Apr. 16, 1976, Ser. No. 677,554
Int. Cl.² C23G *1/02, 1/08, 1/36*
U.S. Cl. 252—136 8 Claims

1. A thickened acid cleaner concentrate composition consisting essentially of:

1. a strange aqueous inorganic acid in an amount from about 5 to about 78 weight percent,
2. an organic acid selected from the group consisting of oxalic, tartaric, citric acid and mixtures thereof in an amount from about 1 to about 6 weight percent,
3. a nonionic surfactant in an amount from about 7 to about 23 weight percent,
4. an anionic surfactant in an amount from about 1 to about 7 weight percent,
5. a flocculating agent containing bivalent iron, trivalent iron or trivalent aluminum in soluble form in acid solution and in an amount of from about 1 to about 12 weight percent, and
6. water in an amount from about 75 to about 12 weight percent;

all weight percents being based on the total composition, provided that the said nonionic surfactant and the said anionic surfactant when taken together constitute from about 10 to about 30 weight percent of said composition and said nonionic surfactant constitutes from about 75 to about 90 weight percent of the combined weight percent of nonionic and anionic surfactants.

4,032,467

AZEOTROPES OF 1,2-DICHLORO-1,1,2-TRIFLUOROETHANE

William Milton Hutchinson, deceased, late of Bartlesville, Okla. (by Florence M. Hutchinson, executrix), assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 610,812, Sept. 5, 1975, Pat. No. 4,002,573, which is a division of Ser. No. 396,814, Sept. 13, 1973, Pat. No. 3,940,342. This application May 27, 1976, Ser. No. 690,808
Int. Cl.² C11D *7/50, 7/30;* C23G *5/02*
U.S. Cl. 252—162 2 Claims

1. A substantially constant boiling admixture of (A) 1,2-dichloro- 1,1,2-trifluoroethane and (B) dichloromethane which at substantially atmospheric pressure is characterized as about 88.6 weight percent (A) and about 11.4 weight percent (B).

4,032,468

HYDROLYTICALLY STABLE URETHANE FOAM PRECURSORS

Kenneth Treadwell, Rahway, and Melvin H. Gitlitz, Edison, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 534,490, Dec. 19, 1974, abandoned. This application Sept. 13, 1976, Ser. No. 722,523
Int. Cl.² C08G *18/18, 18/20, 18/24, 18/32*
U.S. Cl. 252—182 3 Claims

1. A hydrolytically stable precursor for preparing flexible or rigid cellular polyurethanes, said precursor consisting essentially of 100 parts by weight of a polyalkylene polyol, between 0.5 and 5 parts of water, between 0.05 and 0.5 parts of a foaming catalyst, between 0.05 and 2 parts of a silicone surfactant and between 0.05 and 0.5 parts of a gel catalyst, said gel catalyst being selected from the group consisting of organotin compounds of the formulae R_nSnX_{4-n}, R_2SnO and $(R_2Sn)_2O$ wherein R is CH_3— or CH_3OCH_2—, X is selected from the group consisting of the chlorine, bromine and iodine

atoms and radicals of the formula $-OOCCH_3$ or $-OOCCH_2CH_3$ and a is the integer 2 or 3.

4,032,469

PELLETED SULFUR COMPOSITIONS

Henning Bartzsch, Hannover, Germany, assignor to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Division of Ser. No. 401,502, Sept. 27, 1973, Pat. No. 3,979,316. This application May 25, 1976, Ser. No. 689,858
Claims priority, application Germany, Sept. 27, 1972, 2247371
Int. Cl.² C08K 3/30; C09K 3/00
U.S. Cl. 252—182 7 Claims

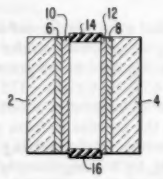
1. A pelleted sulfur composition consisting essentially of particles of sulfur which include a substantial proportion of carbon-disulfide-insoluble sulfur particles together with a binder consisting essentially of a rubber plasticizing oil containing an amount equivalent to between 0.5 and 10% of the weight of the pelleted composition of an anionic or nonionic surfactant, the amount of the plasticizing oil being equivalent to between 10 and 60% by weight of the pelleted composition.

4,032,470

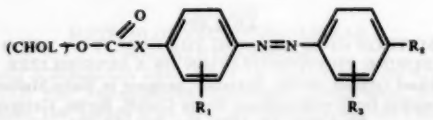
ELECTRO-OPTIC DEVICE

Allen Bloom, East Windsor, and Ling Kong Hung, Edison, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,728
Int. Cl.² C09K 3/34; G02F 1/13
U.S. Cl. 252—299 16 Claims



1. In an electro-optic device comprising a nematic liquid crystal composition between two electrodes, the improvement wherein the nematic liquid crystal composition comprises a nematic liquid crystal having dissolved therein a liquid crystal dye of the formula



wherein (CHOL) represents a cholesteryl radical, X can be O or NH; R_1 can be hydrogen, hydroxy, methyl, fluoro or chloro; R_2 can be hydrogen, $-NO_2$, $-CN$, $-N(alkyl)_2$, alkylcarbonato, alkanoyloxy, alkyl or alkoxy; and R_3 can be hydrogen, methyl, fluoro or chloro, in such amounts that a change in the optical density of the colored nematic liquid crystal composition is produced as a function of voltage applied to said nematic liquid crystal composition.

4,032,471

PROCESS FOR PREPARING YTTRIUM OXIDE AND RARE EARTH METAL OXIDE PHOSPHORS

George W. Luckey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 544,465, Jan. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 376,757, July 5, 1973, abandoned. This application Feb. 11, 1976, Ser. No. 657,350
Int. Cl.² C09K 11/46
U.S. Cl. 252—301.4 R 14 Claims

1. A process of preparing a phosphor having improved x-ray speed which consists essentially of an oxide of an element selected from the group consisting of yttrium, gadolinium, and lanthanum, activated by at least one different rare earth metal activator selected from the group consisting of europium, terbium, gadolinium, and dysprosium, comprising:

heating a mixture of salts of said element and said activator in an oxygen-containing atmosphere to form said phosphor; and in a subsequent heating step

heating said phosphor in a hydrogen-containing mildly reducing atmosphere at an elevated temperature and for a period of time which are sufficient to effect an increase in the X-ray speed of said phosphor, compared to the speed without such subsequent heating step, of at least about 15%.

4,032,472

MANUFACTURE OF ALUMINA SOL

Kenneth R. McCallister, Shreveport, La., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 7, 1976, Ser. No. 647,231
Int. Cl.² B01J 13/00
U.S. Cl. 252—313 R 5 Claims

1. In the manufacture of an alumina sol containing combined chloride or fluoride and from about 13 to about 15 wt. % aluminum wherein metallic aluminum is digested in hydrochloric or hydrofluoric acid, the improvement which comprises first digesting sufficient solid alumina particles in hydrochloric or hydrofluoric acid to provide from about 5 to about 25 wt. % of the aluminum content of the sol product, and thereafter digesting metallic aluminum therein to provide the required remaining amount of aluminum, said hydrochloric or hydrofluoric acid being employed in an amount to provide a sol containing combined chloride or fluoride in from about a 0.5 to about a 2.0 atom ratio with the aluminum content thereof.

4,032,473

WATER-BASED DEFOAMER COMPOSITIONS

Roald K. Berg, Milwaukee, and Douglas S. Smalley, Portland, both of Oreg., assignors to Associated Chemists, Inc., Portland, Oreg.

Filed June 4, 1975, Ser. No. 583,651
Int. Cl.² B01D 19/04
U.S. Cl. 252—358 6 Claims

1. A water-based additive for controlling foaming in aqueous systems, consisting of a stable aqueous emulsion containing as the disperse phase, about 20–30% by weight of a composition comprising:

a. about 25 to 55 parts by weight of a water insoluble mineral hydrocarbon,

b. about 25 to 45 parts by weight of a normally solid fatty acid diamide,

c. about 1.0 to 7.5 parts by eight of hydrophobic silica particles, and

d. about 8 to 16 parts by weight of a non-ionic emulsifier wherein said emulsifier is a stearyl alcohol ethoxylate, and said emulsifier has an HLB of about 9 to 10.

4,032,474

PROCESS FOR THE FLUORIDING OF A CATALYST

Frans Goudriaan, and Pieter B. Kwant, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Apr. 5, 1976, Ser. No. 673,519

Claims priority, application Netherlands, Apr. 18, 1975, 7504620

Int. Cl.² B01J 27/12

U.S. Cl. 252—441 8 Claims

1. A process for the fluoriding of a catalyst with an organic fluorine compound in a liquid distillate hydrocarbon in the presence of hydrogen wherein a fixed bed of catalyst particles is fluorided in-situ at a temperature of 100°–400° C, a pressure of 5–200 bar, a space velocity of 0.5–5 liters of stream of liquid distillate hydrocarbon per liter of catalyst per hour and a hydrogen/said stream of liquid ratio of 200–2000 Nl/L with the use of a constant or variable fluorine slip through the catalyst bed combined or not combined with a positive temperature gradient over the bed, provided that

a. the average fluorine slip (S_A) amounts to at least 10%w,
b. the temperature gradient (G) amounts to at most 30° C,
c. the products of S_A (in %w) and G (in °C) amounts to at most 1000,
d. a constant fluorine slip which on average amounts to less than 40%w is accompanied by a temperature gradient of at least $300/S_A$,
e. a constant fluorine slip which on average amounts to at least 40%w but less than 50%w is accompanied by a temperature gradient of at least ¾ ($50-S_A$) and
f. 0.5–15 parts by weight of fluorine per 100 parts by weight of carrier are applied to the catalyst.

4,032,475

HYDROCARBON CONVERSION WITH A SELECTIVELY SULFIDED ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

H. Peter G. Knapik, Brookfield, and Frank H. Adams, La Grange Park, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Dec. 8, 1975, Ser. No. 638,798

Int. Cl.² B01J 27/04

U.S. Cl. 252—439 12 Claims

1. A selectively sulfided acidic catalytic composite comprising a halogenated porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.1 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt, and tin are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the tin is present in the form of tin oxide; and wherein substantially all of the catalytically available cobalt is present in a sulfided state.

4,032,476

GRANULAR ACTIVATED CARBON MANUFACTURE FROM SUB-BITUMINOUS COAL MIXED WITH CONCENTRATED INORGANIC ACID WITHOUT PITCH

Hari N. Murty, Grand Island, N.Y., assignor to The Carborundum Company, Niagara Falls, N.Y.

Filed June 11, 1975, Ser. No. 585,931

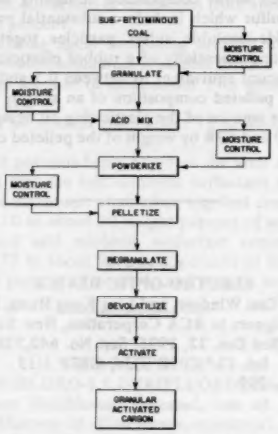
Int. Cl.² B01J 21/18; C01B 31/08, 31/10, 31/14

U.S. Cl. 252—444 23 Claims

1. A process for making granular activated carbon comprising: forming granules from sub-bituminous coal; treating the granules by mixing with not less than about 1 and not more than about 10% by weight of concentrated inorganic acid selected from the group consisting of H_2SO_4, H_3PO_4, HCl and mixtures thereof at a concentration of at least about 50% by weight without the addition of a carbonaceous binder; reducing the treated granules to form powder of more than about 65% by weight −325 mesh and having a moisture, including acid, content of not less than about 10 and not more than about 30% by weight; compressing the powder to form pellets; reducing the pellets to reform granules; devolatilizing the reformed granules, without charring, by heating directly to and at a temperature higher than the charring temperature in an oxygen-free atmosphere; and activating the devolatilized granules by heating to and at a temperature higher than the devolatilizing temperature in an atomsphere containing a gaseous activating agent in order to produce a overall yield of granular activated carbon of about 25 to about 35% by weight, dry coal.

2. Granular activated carbon made by the process of claim 1.

20. A process for making granular activated carbon and comprising: forming granules from sub-bituminous coal; treating the granules by mixing with about 5% by weight of concentrated inorganic acid selected from the group consisting of



H_2SO_4, H_3PO_4, HCl and mixtures thereof at a concentration of at least about 75% by weight, without the addition of a carbonaceous binder; reducing the treated granules to form powder of more than about 65% by weight −325 mesh and having a moisture, including acid, content of about 15 to about 25% by weight; compressing the powder to form pellets; reducing the pellets to reform granules; devolatilizing the reformed granules, without charring, by heating directly to a temperature of about 450° C at a rate of about 300° C/hour in an oxygen-free atmosphere of N_2 and the volatiles and by maintaining the devolatilizing temperature for a time of about 1 hour; and activating the devolatilized granules by heating to a temperature of about 800 to about 900° C in an atmosphere of N_2 and steam and by maintaining the activating temperature for a time of about 4 to about 5 hours; in order to produce an overall yield of granular activated carbon of about 25 to about 35% by weight, dry coal.

4,032,477

METHOD OF ENHANCING THE ELECTRON YIELD DURING PHOTOIONIZATION OF A SENSIBILIZER

Michael Grätzel, Berlin, Germany, assignor to Hahn-Meitner-Institut fur Kernforschung Berlin GmbH, Berlin, Germany

Filed Mar. 18, 1976, Ser. No. 668,291

Claims priority, application Germany, Mar. 27, 1975, 2513746

Int. Cl.² B01J 1/10

U.S. Cl. 252—501 6 Claims

1. In a method of generating electrons by irradiation of a sensibilizer with light in the presence of water, the improvement which comprises a hydrophobic organic polymer having repeating anionic groups present as a separate phase having an

electron-repelling surface in contact with said water, said polymer containing said sensibilizer.

4,032,478

PERFUME COMPOSITIONS CONTAINING P-MENTHANE-8-THIOL-3-ONE

Dietmar Lamparsky, Wangen-Dubendorf, and Peter Schudel, Grut near Wetzikon, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 69,485, Sept. 9, 1970, abandoned. This application Mar. 22, 1974, Ser. No. 453,608

Claims priority, application Switzerland, Sept. 10, 1969, 13748/69

Int. Cl.² A61K 7/46; C11B 9/00

U.S. Cl. 252—522 2 Claims

1. A perfume composition comprising as one of its olfactory ingredients an olfactible amount of pure synthetically-produced p-menthane-8-thiol-3-one having an n_D^{20} of about 1.495 and boiling within the range from about 74° – 75° C. under 0.1mm. of mercury pressure.

4,032,479

CURED OR UNCURED RUBBER COMPOSITION CONTAINING HOMOPOLYMERS OR COPOLYMERS OF EPIHALOHYDRINS

Yukinari Bunnomori; Nobuo Yamada, both of Amagasaki, and Tetsuya Nakata, Ibaraki, all of Japan, assignors to Osaka Soda Co., Ltd., Osaka, Japan

Filed June 18, 1976, Ser. No. 697,344

Claims priority, application Japan, Jan. 16, 1976, 51-4290

Int. Cl.² C08G 65/32

U.S. Cl. 260—2 A 3 Claims

1. A cured or uncured rubber composition comprising

a. 100 parts by weight of a rubber component about 1 to 100% by weight of which consists of an epihalohydrin homopolymer, a copolymer of an epihalohydrin with at least one other epihalohydrin, or a copolymer of an epihalohydrin with at least one comonomer selected from the group consisting of epoxide compounds and dicarboxylic acid anhydrides,

b. about 0.5 to about 10 parts by weight of a salt of 1,8-diazabicyclo(5,4,0)undecane-7 with a compound having one carboxyl group and at least one ethylenically unsaturated linkage,

c. about 1 to about 20 parts by weight of an organic peroxide, and

d. about 1 to about 20 parts by weight of a metal compound selected from the group consisting of oxides of metals of group II of the periodic table, hydroxides of metals of group II, carbonates of metals of group II, silicates of metals of group II, phosphites of metals of group II, carboxylic acid salts of metals of group II, oxides of metals of group IVa of the periodic table, basic carbonates of metals of group IVa, basic carboxylic acid salts of metals of group IVa, basic sulfites of metals of group IVa, basic phosphites of metals of group IVa, and basic sulfates of metals of group IVA.

4,032,480

METHOD OF PRODUCING LINEAR POLYETHYLENIMINE

David Solomonovich Zhuk, ulitsa Vavilova, 44, korpus 4, kv. 172; Petr Alexandrovich Gembitsky, Leningradsky prospekt, 104, korpus 3, kv. 299, and Anatoly Ivanovich Chmarin, Volkovskaya ulitsa, 3, kv. 54, all of Moscow, U.S.S.R.

Filed July 11, 1975, Ser. No. 595,215

Int. Cl.² C08F 22/02; C08G 73/06

U.S. Cl. 260—2 EN 4 Claims

1. A method of producing linear polyethylenimine, comprising polymerization of nitrogen-containing heterocyclic compounds selected from the group consisting of ethylenimine and oligomers thereof, viz. dimer, trimer and linear tetramer, at a temperature within the range of from 40 to 55° C in the presence of cationic catalysts selected from the group consisting of hydrochloric acid, sulphuric and chloric acid, ammonium salts of hydrochloric acid and chloric acid, dichloropropane and dichloropropanol and taken in an amount ranging from 0.1 to 1.0 mol.% per each elementary unit; said polymerization in mass being conducted until a conversion ratio of ethylenimine cycles of 10 to 25% is reached; thereafter, the resulting polymerization mixture is cooled to a temperature within the range of from 5 to 25° C, added with water at a weight ratio between water and the polymerization mixture ranging from 1:2.5 to 2.5:1 and maintained at a temperature within the range of from 5° to 25° until completion of the polymerization process to obtain a heterogeneous polymerization mixture containing linear polyethlenimine crystallohydrate as a precipitate; said precipitate is separated from the heterogeneous polymerization mixture and dehydrated by drying in vacuum at a temperature within the range of from 40° to 100° C.

4,032,481

HEAT STABILIZERS FOR EXPANDABLE STYRENE POLYMERS

Walter O. Pillar, Monroeville, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Jan. 30, 1976, Ser. No. 653,688

Int. Cl.² C08J 9/22

U.S. Cl. 260—2.5 FP 10 Claims

1. In a process for making styrene polymer particles less flammable by impregnating the polymer particles by heating in aqueous suspension in the presence of an organic halogen compound known to impart reduced flammability to styrene polymer particles and a blowing agent at temperatures greater that 100° C., the improvement comprising adding, prior to impregnation, about 0.2 to 4.0 percent by weight of a thermal stabilizer system for the organic halogen compound; said stabilizer system consisting essentially of a mixture of:

a. 0.06–1.2 percent by weight of barium nonylphenoxide;

b. 0.02–0.4 percent by weight of cadmium 2-ethylhexanoate;

c. 0.02–0.4 percent by weight of tricresyl phosphite;

d. 0.07–1.40 percent by weight of epoxidized soybean oil; and

e. 0.03–0.60 percent by weight of 2,2-bis [p-(1,2-epoxypropoxy phenyl] propane,

wherein the sum of (a), (b) and (c) is equal to the sum of (d) and (e), and all percents are based on the weight of styrene polymer particles; whereby the polymer molecular weight is not degraded during the impregnation process.

4,032,482

PROCESS FOR PRODUCING CHELATING RESIN AND PRODUCT PRODUCED THEREBY

Masafumi Moriya, Tokyo; Kazuo Hosoda, Hoya; Makoto Takai, Chiba, and Shiro Mano, Iruma, all of Japan, assignors to Miyoshi Yushi Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1975, Ser. No. 560,174

Claims priority, application Japan, Mar. 25, 1974, 49-32485; Feb. 12, 1975, 50-16903

Int. Cl.² C08G 30/14

U.S. Cl. 260—2.2 R 27 Claims

1. A process for producing a spherical cured resin comprising the steps of:

1. preparing a solution of 38 to 90 weight percent of a prepolymer by a poly addition reaction of:

a. a poly-N-substituted polyamine,

b. a poly-N-substituted polyalkylene imine, or

c. a mixture of (a) and (b),

with an epoxy compound having at least two vicinal epoxy groups, said prepolymer obtained by a polyaddition reaction of (a), (b) or (c) with an equal epoxy equivalent of said vicinal epoxy compound to mole number of active hydrogen atoms, optionally in the presence of a curing agent;

2. forming an aqueous suspension of the thus-prepared prepolymer of step (1) in an aqueous solution of a water-soluble high polymer or a non-ionic surfactant, wherein the weight ratio of prepolymer solution to aqueous solution is 1:1.93 to 1:7.87, and curing the prepolymer in said aqueous solution;

said poly-N-substituted polyamine, poly-N-substituted polyalkylene imine or mixtures thereof having a structure in which an active hydrogen atom bonded to a nitrogen atom of a corresponding polyamine or polyalkylene imine is replaced by a group selected from the group consisting of a cyanoalkyl radical, alkali metal salts of a carboxyalkyl group, and alkyl esters of a carboxyalkyl group, and in which at least two of the active hydrogen atoms bonded to nitrogen atoms remain.

4,032,483

MANUFACTURE OF POLYURETHANES FROM BARK

Seymour Hartman, Mahopac, N.Y., assignor to Champion International Corporation, Stamford, Conn.

Filed Apr. 20, 1976, Ser. No. 678,471
Int. Cl.² C08G 18/14, 18/00; C08H 5/04; C08L 99/00
U.S. Cl. 260—2.5 AM 10 Claims

1. In a process for the production of rigid compositions in which polyisocyanate is reacted with polyol to produce polyurethane, the improvement comprising employing bark or bark components as the polyol.

4,032,484

FIRE-RETARDANT POLYURETHANE COMPOSITION

Heinz Schulze, and Howard P. Klein, both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,393
Int. Cl.² C08G 18/46, 18/50, 5/34
U.S. Cl. 260—2.5 AJ 8 Claims

1. A fire-retardant polyurethane which is the reaction product of an amino polyether polyol or an amino polyester polyol and an organic polyisocyanate formed in the presence of 2,4,5-tribromoimidazole as a fire-retardant chemical.

2. The polyurethane of claim 1 whicn is in a foam form having been prepared by reacting said amino polyol and said polyisocyanate in presence of a blowing agent.

4,032,485

POLYURETHANE FOAMS BASED ON MIXED ITACONIC ACID POLYESTERS

Koji Onoda, Tokyo; Atsuyuki Matsumoto, Tokorozawa; Hiroshi Ogawara, Matsudo, and Akira Nishimura, Kokubunji, all of Japan, assignors to Miyoshi Yushi Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,726
Int. Cl.² C08G 18/14, 18/42
U.S. Cl. 260—2.5 AN 28 Claims

1. In a process for preparing a durable elastic polyurethane foam by reacting a polyol with an organic polyisocyanate and a blowing agent, the improvement comprising including an effective amount of a polymer-polyol consisting of a polymer resulting from the radical polymerization through a reactive double bond of a polyester prepared by reacting an acid component containing itaconic acid alone or itaconic acid together with up to 88/140 of at least one other dibasic acid selected from the group consisting of succinic acid, adipic acid, sebacic acid and phthalic acid based on the total weight of the itaconic acid and said other dibasic acid with a polyol having a molecular weight of at least 2,000 and also having the general formula $R[(OR')_nOH]_m$ in which R represents a polyol residue having at least three reactive hydrogen atoms, R' represents ethylene or propylene, n is an integer from 30 to 100 and m is an integer from 3 to 6, in the raio of one mole of the average molecular weight of said acid component to one to six moles of said polyol.

4,032,486

ADHESIVES TACKIFIED WITH PHENOL-DIENE-OLEFIN ADDUCTS HAVING NUMBER AVERAGE MOLECULAR WEIGHT BETWEEN ABOUT 600 TO 6000

Ramsis Gobran, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 23, 1973, Ser. No. 408,592
The portion of the term of this patent subsequent to Aug. 24, 1993, has been disclaimed.
Int. Cl.² C08L 7/00; C09J 3/12
U.S. Cl. 260—4 AR 12 Claims

1. A tacky adhesive composition comprising

1. 5 to 200 parts by weight phenol-diene-olefin resin having a number average molecular weight between about 600 and about 6000, said resin being produced by first reacting about 2 moles of a phenol with about 1 mole of non-conjugated diene, and then reacting 1 to 4 moles of olefin with the reaction product, both reactions being carried out in an inert atmosphere, in the presence of a Friedel-Crafts catalyst, and at a temperature in the range of about 20° C to 180° C, wherein said phenol has at least 2 ortho and/or para positions free for reaction, and wherein said olefin is selected from the group consisting of styrene, α-methylstyrene, chlorostyrene, vinyltoluene, t-butylstyrene, hexene-1, hexene-2, octene-1, 2-ethylhexene-1, indene, cylohexene, methyl vinyl ether, isobutyl vinyl ether, allyl propyl ether, methyl cinnamate, dimethyl fumarate, N-vinylpyridine, N-vinylpyrrolidone, and N-vinylcarbazole, and

2. about 100 parts by weight of a rubbery material selected from the group consisting of natural rubber and cis-polybutadiene.

4,032,487

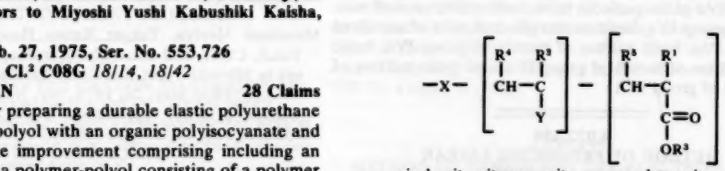
AQUEOUS ACRYLATE-EPOXY SILANE CROSSLINKER ADHESIVE DISPERSION COMPOSITION

Peter Spiros Columbus, Whitestone, N.Y., assignor to Borden, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 453,245, March 21, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 676,046
Int. Cl.² C08L 1/28
U.S. Cl. 260—17 R 12 Claims

1. An aqueous adhesive dispersion composition of pH of 8 to 12 containing 25 to 75% by weight of water having dispersed therein reaction product of A and B, as defined below:

A. a water insoluble binder polymer having the following structural formula:



vinyl unit I nitrogen unit II acrylate unit III

where R^1 and R^2, which can be same or different are selected from H, lower-alkyl groups of 1 to 4 carbon atoms, halogens, $-CH_2COOR$, $-COOR$, and $-CH_2COOH$ groups where R is a lower alkyl group of 1 to 8 carbon atoms;

R^3 is selected from H and lower alkyl groups of 1 to 8 carbon atoms, at least or portion of R^3 radical being H to give free carboxyl groups;

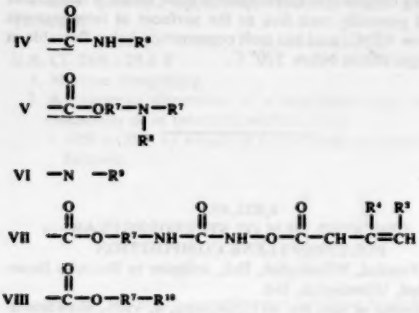
R^4 and R^5, which can be same or different, are selected

from H, —COOH and —COOR groups, where R is as defined above;

X is derived from copolymerizable vinyl monomers and is different from the acrylate unit III;

Y is a nitrogen-containing radical of unit II which is derived from a nitrogen-containing monomer;

radical Y is selected from the following radicals:



where R^6 is selected from H, $-R^7NR^8$ and $-R^7OH$;

R^7 and R^8 being same or different lower alkyl radicals of 1 to 5 carbon atoms;

R^9 is a heterocyclic nitrogen-containing group selected from substituted ethylene urea groups;

R^{10} is a heterocyclic nitrogen-containing group selected from pyridyl groups; and

B. an effective amount, to effect crosslinking of the binder polymer, of a silane containing both alkoxy and epoxy functionalites.

4,032,488

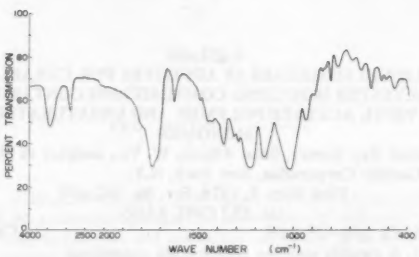
DEXTRAN ESTER-OLEFIN COMPOUND COPOLYMER AND PROCESS FOR PREPARING SAME

Shusaburo Kokkoku, Gifu, and Yasuhiko Onishi, Inazawa, both of Japan, assignors to Meito Sangyo Kabushiki Kaisha, Nagoya, Japan

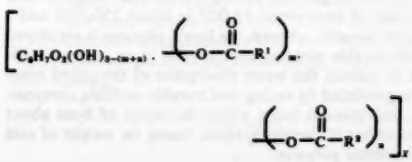
Filed Oct. 3, 1975, Ser. No. 619,178

Int. Cl.² C08L 5/02

U.S. Cl. 260—17.4 GC 8 Claims



1. A dextran ester-olefin compound copolymer comprising a unit derived from a dextran ester of the following formula (1)



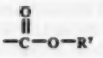
(1)

wherein R^1 is a C_2–C_{18} organic radical having the

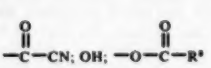
bond derived from the >C=C< bond of an unsaturated acid, R^2 is a C_1–C_{18} alkyl radical, m is a positive number having a value of $0<m\quad 3$, n is a positive number having a value of $0\quad n<3$, with the proviso that $m+n<3$, and x is a positive number having a value of 5 or more; and a unit derived from a polymerizable olefin compound of the following formula (2)

(2)

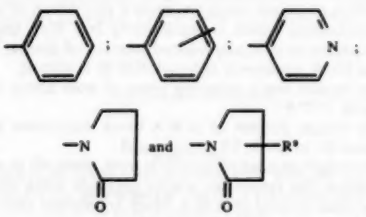
wherein R^3, R^4 and R^5 are each selected from the group consisting of hydrogen and CH_3 and R^6 is a member of the group consisting of



[where R^7 is a member of the class consisting of hydrogen, C_1–C_{18} alkyl radicals, cyclohexyl radical, lower alkyl-substituted cyclohexyl radical, C_1–C_8 hydroxyalkyl radicals, $-N(R^{10})_2$ where the two R^{10}'s which may be the same or different are members of the group consisting of hydrogen and a C_1–C_4 alkyl radical, C_1–C_8 aminoalkyl radicals, C_1–C_8 dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, lower alkyl-substituted tetrahydrofuran radical, benzyl radical and $(CH_2CH_2O)_yCH_2CH_2OH$ radical where y is a positive integer from 1 to 10];



where R^9 is a C_1–C_8 alkyl radical;



where R^9 is a lower alkyl radical.

4,032,489

BUTYL GLAZING COMPOSITION

Hilmar Haverstreng, Sao Paulo, Brazil, assignor to USM Corporation, Boston, Mass.

Filed June 24, 1975, Ser. No. 589,697

Claims priority, application Germany, July 4, 1974, 2432496

Int. Cl.² C08L 51/00, 93/00

U.S. Cl. 260—27 BB 4 Claims

1. A hot melt sealant consisting essentially of at least 30% by weight of butyl-rubber, from 25% to 45% by weight of tackifying resin, from 20% to 40% by weight of finely divided

filler and sufficient of a styrene/butadiene/styrene block copolymer or of styrene/isoprene/styrene block copolymer to provide 0.5 to 10% by weight copolymer in the sealant.

4,032,490

WAX COMPOSITIONS FOR FLAME RETARDANT ELECTRICAL INSULATION COATINGS

Takao Murata; Nobutaka Nakamura, and Tateo Goto, all of Fujieda, Japan, assignors to Sumitomo Durez Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 524,304, Nov. 15, 1974, abandoned. This application Oct. 10, 1975, Ser. No. 621,458
Int. Cl.² C08L *91/00*
U.S. Cl. 260—28 P **6 Claims**

1. In an electrical insulating composition comprising a microcrystalline wax, a halogenated organic flame retardant, and a synthetic resin, the improvement wherein the insulating composition contains as a flame retardant tribromophenol alkyl ether which has a decomposition temperature above about 200° C and which has a melting point of about 70° C to about 150° C in a proportion of about 10 to about 200 percent by weight of the wax and as the synthetic resin a thermoplastic resin selected from the group consisting of phenolic resins, alkyl-phenolic resins, alkyl-benzene resins, terpene resins, cumarone resins, guanamine resins, and alicyclic saturated hydrocarbon resins, said thermoplastic resin having a melting point of about 70° C to about 150° C and is present in a proportion of about 10 to about 50 percent by weight of said wax.

4,032,491

ROOFING COMPOSITION AND RESULTING PRODUCT

William Emil Schoenke, Dallas, Tex., assignor to Butler-Schoenke Roofing Specialties, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 408,153, Oct. 19, 1973, abandoned. This application June 6, 1975, Ser. No. 584,656
Int. Cl.² C08L *91/00*
U.S. Cl. 260—28.5 AS **13 Claims**

1. In a fluid, curable roofing composition which is free from terminally-reactive diolefin polymer and from a curing or vulcanization agent and which comprises an intimate admixture of elastomer and asphalt, the improvement wherein:

a. the elastomer is in the form of a midblock B of an A-B-A block copolymer wherein each end block A is a polymer block of a polymerized vinyl aromatic monomer and the midblock B is a polymer block of polymerized aliphatic hydrocarbon monomer, the polymerized aliphatic hydrocarbon monomer having at most a proportion of olefinic unsaturation which is significantly less than that of a polydiene or of a polymerized mixture of dienes,

b. the block copolymer is in solution in a solvent,

c. the asphalt has a softening point of from about 100° to about 175° F,

d. the weight percent of A-B-A block copolymer is from about 60 to about 95 percent and

e. the weight percent of asphalt is from about 40 to about 5 percent, the respective weight percents being based on the total amount of A-B-A block copolymer and asphalt in the roofing composition.

4,032,492

HOT MELT CONTAINER CLOSURE SEALANT

Paul A. Englund, St. Paul, and James A. Collins, North Oaks, both of Minn., assignors to H. B. Fuller Company, St. Paul, Minn.

Filed Feb. 25, 1976, Ser. No. 661,269
Int. Cl.² C08L *91/00*
U.S. Cl. 260—28.5 A **5 Claims**

1. A hot melt composition comprising an intimate admixture of the following components:

a. 15–45% by weight of a hydrocarbon wax;

b. 5–35% by weight of a rubbery block co-polymer said block co-polymer comprising at least one A-B-A unit, the A blocks of said A-B-A unit comprising repeating vinyl arene units and the B block comprising a rubbery ethylene-butylene or butadiene polymer;

c. 20–45% by weight of an essentially hydrocarbon oil;

d. 1–8% by weight of a liquid silicone which is essentially non-toxic; and

e. up to 30% by weight of a resinous thermoplastic polymer containing vinyl arene units; said hot melt composition being substantially homogeneous in the molten phase and being deformable thermoplastic solid which is lubricitous and generally tack-free at the surfaces at temperatures below 65° C.; said hot melt composition being flowable at temperatures below 320° C.

4,032,493

ORIENTED FILM OF STEREOREGULAR POLYPROPYLENE COMPOSITION

Miguel Pascual, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 601,754, Aug. 4, 1975, abandoned. This application Sept. 3, 1976, Ser. No. 720,326
Int. Cl.² C08L *23/00*
U.S. Cl. 260—28.5 A **4 Claims**

1. A film of a compatible blend of (1) stereoregular polypropylene, (2) a hydrocarbon wax selected from the group consisting of (a) paraffin waxes having a melting point of 100° F. to 155° F., (b) microcrystalline waxes having a melting point of 150° F. to 200° F. and (c) Fischer Tropsch waxes having a melting point of 180° F. to 220° F., and (3) a hydrogenated hydrocarbon polymer having a drop softening point above about 70° C., an average molecular weight of at least 500, and an iodine value less than 50, said hydrocarbon wax being present in the amount of 0.4 to 5% by weight of the polypropylene and said hydrogenated hydrocarbon polymer being present in the amount of 1 to 60% based on the weight of the polypropylene, said film possessing improved printability with low surface tension inks as compared to a film made from a blend of ingredients (1) and (3) alone.

4,032,494

LIQUID SILOXANES AS ADDITIVES FOR CURABLE POLYESTER MOULDING COMPOSITIONS CONTAINING VINYL ACETATE POLYMER AND UNSATURATED MONOMER

Robert Ray Gentry, Saint Albans, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 3, 1976, Ser. No. 663,454
Int. Cl.² C08L *67/06*
U.S. Cl. 260—29.1 SB **24 Claims**

1. A curable molding composition containing:

a. a polyester resin that is suitable for use in molding and which comprises the reaction product of an olefinically unsaturated dicarboxylic acid or anhydride and a polypol;

b. an olefinically unsaturated monomer that is copolymerizable with said polyester resin;

c. a vinyl acetate polymer having a molecular weight within the range of from about 10,000 to about 250,000; and

d. a liquid siloxane, wherein the liquid siloxane is employed in said curable molding composition in an amount sufficient to reduce the water absorption of the cured composite produced by curing said curable molding composition, said amount being within the range of from about 0.5 to about 10 weight percent, based on weight of said vinyl acetate polymer.

4,032,495

WATER-REPELLENT AND OIL-REPELLENT COMPOSITIONS BASED ON FLUORINE COMPOUND

Jean Perronin, Chantilly, and André Louis Dessaint, Nogent sur Oise, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Continuation of Ser. No. 339,668, March 9, 1973, abandoned. This application Jan. 2, 1976, Ser. No. 645,979

Claims priority, application France, Mar. 10, 1972, 72.08366

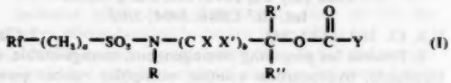
Int. Cl.² C08L *27/12*; C08F *214/18*

U.S. Cl. 260—29.6 F 19 Claims

1. Mixture comprising:

I. An aqueous dispersion of a copolymer (A) consisting essentially of in interpolymerized form:

1. 30% to 99% by weight of one or more monomers of the formula:



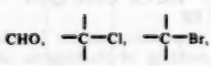
(I)

in which Rf represents a perfluoro straight or branched alkyl group containing from 1 to 20 carbon atoms, *a* is a whole number between 2 and 20 inclusive, R represents a hydrogen atom or an alkyl group containing 1 to 10 carbon atoms, a cycloalkyl group containing 5 to 12 carbon atoms, an hydroxyalkyl group containing 2 to 4 carbon atoms or an aryl group unsubstituted or substituted by an alkyl radical containing 1 to 6 carbon atoms, R′, R″, X and X′ are the same or different and represent hydrogen atoms or alkyl groups containing 1 to 4 carbon atoms, *b* is a whole number between 1 and 4 inclusive, and Y represents the residue from removal of a carboxyl group of an alkenemono- or -di-carboxylic acid or a monoalkyl ester of such a dicarboxylic acid;

2. Up to 70% by weight of one or more compounds containing at least one polymerizable ethylene linkage and no perfluoro groups; and

3. Up to 10% by weight of one or more monomers different from the compounds of (A) (2) and containing an ethylene linkage and at least one reactive group, said reactive group being an OH, NH_2, NH-alkyl, COOMe, SO_3H,

CN,



$-SO_2-CH=CH_2$ or $-NH-CO-CH=CH_2$ group; and

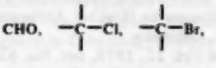
II. An aqueous dispersion of a copolymer (B) different from copolymer (A) and consisting essentially of in an interpolymerized form:

1. 1% to 70% by weight of one or more monomers of formula (I);

2. 30% to 99% by weight of one or more compounds containing at least one polymerizable ethylene linkage and no perfluoro groups; and

3. 0% to 10% by weight of one or more monomers different from the compounds of (B)(2) and containing an ethylene linkage and at least one reactive group, said reactive group being an OH, NH_2, NH-alkyl, COOMe, SO_3H,

CN,



$-SO_2-CH=CH_2$ or $-NH-CO-CH=CH_2$ group; and wherein said mixture contains an aqueous dispersion of a copolymer (A) containing a large proportion of said perfluoro alkyl groups with an aqueous dispersion of a copolymer (B) containing a relatively small proportion of perfluorinated groups,

the weight of one or more monomers of the formula (I) contained in the copolymer (A) being greater than that of one or more monomers of the formula (I) contained in the copolymer (B).

4,032,496

AQUEOUS COATING COMPOSITIONS CONTAINING A POLYLIGAND SOLUTION POLYMER

Frank Russell Spencer, Morris, and Edwin Ralph Kolodny, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 29, 1975, Ser. No. 600,178

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.6 TA 5 Claims

1. A coating composition comprising water and from about 10–20 weight percent of (a) a polyligand polymer, prepared by free radical polymerization in solution in a water soluble organic solvent having a boiling point of at least 150° C., of from about 10–15% by weight of methacrylic acid, 60–70% by weight of methyl methacrylate and 20–25% by weight of butyl acrylate, said polymer having an intrinsic viscosity in the range of 0.06 to <0.2 and saponified, at least in part, with (b) aqueous ammonia in an amount sufficient to provide at least an equivalent of ammonia per carboxyl group in said polymer (NH_4^+/COO^-) of at least 1% and (c) a metal fugitive complexing agent capable of undergoing ligand transfer with carboxyl groups in the polymer, selected from zinc ammonium formate, acetate and carbonate, in an amount sufficient to provide a zinc content based on solids content of from about 0.17 to 1.65%.

4,032,497

METHOD AND APPARATUS FOR REMOVAL OF UNREACTED MONOMER FROM SYNTHESIZED HIGH POLYMER LATEX

Kunizoh Kidoh; Hideki Wakamori, and Kamizo Iimura, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 15, 1975, Ser. No. 596,062

Claims priority, application Japan, July 19, 1974, 49-83676

Int. Cl.² C08L *27/06*

U.S. Cl. 260—29.6 R 8 Claims

1. A method for the removal of unreacted monomers from a polymer latex comprising:

providing a hollow cylinder inclined at a gradient of 1/100 to 1/10 with respect to the horizontal plane;

rotating said hollow cylinder;

introducing the polymer latex into the top of said rotating cylinder; and

introducing a moisture-containing gas into said rotating cylinder for contact with the latex.

4,032,498
FLAME-RETARDANT PLASTICIZERS FOR POLYVINYL CHLORIDE

Franz-Josef Dany, Erftstadt; Joachim Wortmann, Turnich; Peter Münch, and Hartfrid Vollmer, both of Erftstadt, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

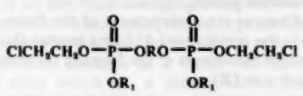
Filed Oct. 21, 1975, Ser. No. 624,545

Claims priority, application Germany, Oct. 24, 1974, 2450949

Int. Cl.² C08K *5/52*

U.S. Cl. 260—30.6 R **18 Claims**

1. A flame-retardant composition consisting essentially of polyvinyl chloride and a plasticizer therefor of the formula



in which R stands for an alkylene radical or a halogen-substituted alkylene radical having from 2 to 6 carbon atoms, a $-CH_2CH_2-O-CH_2CH_2-$radical, a phenylene or an alkyl or halogenoalkyl-substituted diphenylenemethane radical, and R_1 stands for a branched or unbranched alkyl radical having from 6 to 18 carbon atoms.

4,032,499
METHOD FOR PREPARING MODIFIED POLYSILOXANES

Franz-Heinrich Kreuzer, and Manfred Wick, both of Munich, Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Germany

Filed Jan. 31, 1975, Ser. No. 545,958

Claims priority, application Germany, Feb. 7, 1974, 2405828

Int. Cl.² C08K *5/05*

U.S. Cl. 260—33.4 SB **7 Claims**

1. A method for preparing modified organopolysiloxanes which comprises contacting an organopolysiloxane in which the organic groups connected to the silicon atoms are selected from the group consisting of monovalent hydrocarbon radicals, halogenated monovalent hydrocarbon radicals and cyanoalkyl radicals with a monomer having aliphatic unsaturation in the presence of a free radical initiator and an inert liquid having a boiling point up to 100° C. at 760 mm Hg (abs.) in which the inert liquid is present in an amount of from 2 to 20 percent by weight based on the total weight of the organopolysiloxane, monomer and free radical initiator and is a nonsolvent at the polymerization temperature for the organopolysiloxane and the polymers obtained from the polymerization and the weight ratio of the organopolysiloxane to monomer is from 10:90 to 90:10.

4,032,500
CURABLE SEALANT TWO-COMPONENT COMPOSITION CONTAINING BUTYL RUBBER DERIVED FROM ISOOLEFIN AND OPEN-CHAIN CONJUGATED DIOLEFIN

Russell William Koch, Hartville, and Arthur Eugene Oberster, North Canton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Mar. 22, 1976, Ser. No. 668,880

Int. Cl.² B60C *5/14, 21/08;* **C08K** *5/01;* **C08L** *75/04*

U.S. Cl. 260—33.6 AQ **9 Claims**

1. A curable and solventless sealant composition consisting essentially of a mixture of (a) a mixture of about 100 parts low molecular weight elastomeric isocyanate terminated prepolymer, said prepolymer having from about 3.5 to about 4.5% NCO content, from about 250 parts to about 400 parts medium process oil, said oil having a Brookfield viscosity at 22° C. of about 10 to 500 cps, and from about 50 parts to about 70 parts low molecular weight uncured butyl rubber having a Staudinger molecular weight of 5,000 to 15,000, and, (b) a mixture of from about 150 parts to about 250 parts low molecular weight polyol having a molecular weight of from 400 to 5,000, said polyol having about 0.8 milliequivalent per gram hydroxyl, from about 40 to about 65 parts low molecular weight uncured butyl rubber having a Staudinger molecular weight of 5,000 to 15,000, from about 225 to about 275 parts of a medium process oil as in (a) and from about 0.1 to about 10.0 parts catalyst for the reaction of said prepolymer and said polyol, said (a) and said (b) being mixed together in a volume ratio of from about 1.0 to 1.0.

4,032,501
DRY-BLENDABLE SOLUTION RUBBER POWDERS AND PROCESS

Donald Norman Schulz, Hartville, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed July 11, 1975, Ser. No. 594,985

Int. Cl.² C08K *3/04, 5/01*

U.S. Cl. 260—33.6 AQ **2 Claims**

1. Process for preparing homogeneous, storage-stable, dry-blendable, hydrocarbon solution non-polar rubber powder having a DSV from about 1.5 to about 7.0 (100 parts) containing carbon black, said process being carried out by sequentially (1) grinding carbon black (60–90 phr) in water (2) mixing at a temperature of 20°–100° C., the composition resulting from said (1) with a hydrocarbon solution of rubber, about 5–25% (w/w), to form a liquid two phase dispersion of (a) hydrocarbon, solvent, carbon black, and rubber, and (b) water; (3) stripping the liquid dispersion of said (2) of solvent by adding, at a rate of between about 360–1270 g./min., said dispersion to vigorously stirred hot water (85–120° C.) in the presence of at least one foam inhibiting surfactant selected from the group consisting of (a) nonionic polyether alcohols with blocked terminal hydroxyl group (0.01–5.0 phr), and, (b) cationic tetraalkylammonium salts having more than 25 carbon atoms in the cation of said salt (0.01–5.0 phr), to produce powder, (4) drying said powder to produce a homogeneous, clean and free-flowing powder having a mean particle size from 0.8 to 1.5 mm., with about one-half of said particles having a particle size greater than 1.0 mm.

4,032,502
ORGANOSILOXANE COMPOSITIONS FOR LIQUID INJECTION

Chi-Long Lee; Ollie W. Marko, both of Midland, and Jay R. Schulz, Bangor Township, Bay Count, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

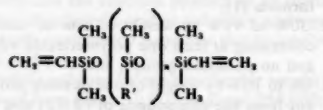
Filed Oct. 10, 1975, Ser. No. 621,432

Int. Cl.² C08L *83/04*

U.S. Cl. 260—37 SB **11 Claims**

1. A curable composition suitable for use in a method of liquid injection molding of elastomeric articles, consisting essentially of

a. 100 parts by weight of an essentially linear polydiorganosiloxane fluid copolymer having two siloxane-bonded vinyl groups per molecule and having the average formula



wherein from 25 to 75 percent of all R′ groups are 3,3,3-trifluoropropyl and the remaining R′ groups are methyl and *n* has an average value such that the viscosity of (a) has a value of from 500 to 10,000 centistokes at 25° C.,

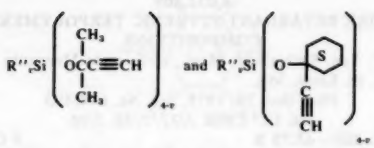
b. an organosiloxane, soluble in (a) and consisting essentially of

i. a polyorganosiloxane consisting essentially of $H(CH_3)_2SiO_{1/2}$ units and units selected from the group consisting of $QSiO_{3/2}$ units and $SiO_{4/2}$ units, there being from 3 to 10 inclusive silicon-bonded hydrogen atoms per molecule of (i), Q is 3,3,3-trifluoropropyl, phenyl or an alkyl group having 1 to 6 inclusive carbon atoms and the ratio of the total number of $SiO_{4/2}$ units and $QSiO_{3/2}$ units to $H(CH_3)_2SiO_{1/2}$ units in (i) has an average value of from 0.25 to 0.75 and,

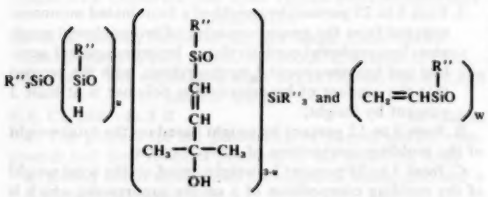
ii. a polydiorganosiloxane consisting essentially of $H(CH_3)_2SiO_{1/2}$ units and R''_2SiO units, wherein each R'' methyl, ethyl, phenyl, or 3,3,3-trifluoropropyl, there being two silicon-bonded hydrogen atoms per molecule of (ii) and an average of from 3 to 10 silicon atoms per molecule of (ii), the amounts of (i) and (ii) being sufficient to provide a total of from 0.75 to 3.0 silicon bonded hydrogen atoms in (b) for every silicon-bonded vinyl group in the composition and from 0 to 1 inclusive silicon-bonded hydrogen atom in (ii) for every silicon-bonded hydrogen atom in (i),

c. a platinum-containing catalyst, soluble in (a) and providing at least 1 part by weight of platinum for every 1 million parts by weight of the composition,

d. an effective amount of a platinum catalyst inhibitor selected from the group consisting of acetylenic silanes of the formulae



and olefinic siloxanes of the formulae



wherein R'' is, independently, methyl, ethyl, phenyl or 3,3,3-trifluoropropyl, *u* is an integer from 1 to 2 inclusive, *v* is an integer from 0 to 2 inclusive and *w* is an integer from 3 to 6 inclusive, and

e. at least 5 parts by weight of a reinforcing silica filler having a surface area of at least 50 square meters per gram and having the surface thereof treated with an organosilicon compound to prevent appreciable crepe-aging of the curable composition; said curable composition having a Standard Injection Rate of greater than 100 grams per minute at 25° C. a Standard Cure Time of less than 100 seconds at 121° C., a Standard Pot Life of greater than 10 hours at 25° C., and when heated at 150° C. for 15 minutes and at 200° C. for 8 hours, will cure to an elastomeric material characterized by a tensile strength greater than 42 kg./sq.cm., and elongation at break greater than 300 percent and a tear strength greater than 7 kg./cm.

4,032,503

PROCESS FOR THE MANUFACTURING OF STYRENE DERIVATIVES, NEW STYRENE DERIVATIVES AND THEIR USE AS OPTICAL BRIGHTENERS

Géza Kormány, Allschwil; Guglielmo Kabas, Aesch; Hans Schläpfer, and Adolf Emil Siegrist, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

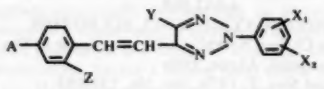
Filed Aug. 6, 1975, Ser. No. 601,884

Claims priority, application Switzerland, Aug. 14, 1974, 11110/74

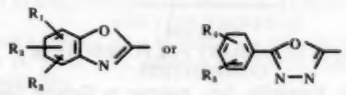
Int. Cl.² C08K *5/35*

U.S. Cl. 260—40 P **13 Claims**

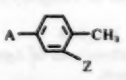
1. Process for the manufacture of styrene compounds of the formula



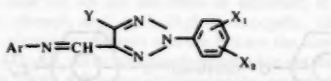
wherein A denotes one of the ring systems



and wherein R_1 denotes hydrogen, alkyl with 1 to 8 carbon atoms, cyclohexyl, phenylalkyl with 1 to 3 carbon atoms in the alkyl part, phenyl, alkoxy with 1 to 4 carbon atoms, or chlorine, or, conjointly with R_2, denotes alkylene with 3 or 4 carbon atoms, R_2 denotes hydrogen or alkyl with 1 to 4 carbon atoms or, conjointly with R_1, denotes alkylene with 3 or 4 carbon atoms, R_3 denotes hydrogen or methyl, R_4 denotes hydrogen, m-methyl, alkyl with 2 to 8 carbon atoms, phenyl, alkoxy with 1 to 4 carbon atoms, or chlorine, or, conjointly with R_3, denotes a fused benzene ring, R_5 denotes hydrogen or chlorine or, conjointly with R_4, denotes a fused benzene ring, X_1 denotes hydrogen, alkyl with 2 to 4 carbon atoms, alkoxy with 1 to 4 carbon atoms or chlorine, X_2 denotes hydrogen or chlorine, Y denotes hydrogen, chlorine, alkyl with 1 to 4 carbon atoms or phenyl and Z denotes hydrogen or chlorine, which comprises reacting a methyl compound of the formula



with a Schiff's base of the formula



wherein Ar denotes an aromatic radical, in dimethylformamide in the presence of a strongly basic alkali metal compound, the reaction mixture being irradiated, at least initially, with UV light.

4,032,504
X-RAY OPAQUE FILLER USEFUL IN DENTAL AND MEDICAL RESTORATIVE COMPOSITIONS

Henry L. Lee, Jr., Pasadena, and Jan A. Orlowski, Altadena, both of Calif., assignors to Lee Pharmaceuticals, South El Monte, Calif.

Continuation of Ser. No. 401,810, Sept. 28, 1973, abandoned. This application Dec. 19, 1974, Ser. No. 534,374

Int. Cl.[2] C09K *3/00*; C08K *7/14*

U.S. Cl. 260—42.18 **10 Claims**

1. An X-ray opaque filler for synthetic resin compositions comprising from about 5% to about 35% by weight of particulate barium glass having a refractive index of from about 1.7 to about 2.0 and from about 95 to about 65% by weight of an X-ray transparent particulate filler material having a refractive index which closely approximates the refractive index of the synthetic resin composition to be filled.

4,032,505
2,4-DIHYDROXYDIPHENYL SULFOXIDE

Dwight William Chasar, Northfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 2, 1976, Ser. No. 737,955

Int. Cl.[2] C08K *5/41*; C07C *39/12*

U.S. Cl. 260—45.8 N **8 Claims**

1. 2,4-Dihydroxydiphenyl sulfoxide.

2. A composition comprising a polyolefin and a stabilizing amount of 2,4-dihydroxydiphenyl sulfoxide.

4,032,506
FLAME RETARDANT POLYCARBONATE COMPOSITION

Victor Mark, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 429,128, Dec. 28, 1973, Pat. No. 3,953,396. This application Mar. 26, 1976, Ser. No. 670,678

Int. Cl.[2] C08K *5/16*

U.S. Cl. 260—45.9 R **12 Claims**

1. A flame retardant aromatic carbonate polymer composition comprising in admixture an aromatic carbonate polymer and a minor amount of a metal salt of substituted and unsubstituted sulfonic acids of mixtures of monomeric and polymeric aromatic ethers, and polymeric aromatic ethers wherein said metal salts thereof are selected from the group consisting of alkali metals and alkali earth metals, and mixtures of these metal salts, and said substituent on the metal salt of the substituted sulfonic acids of aromatic ethers is selected from the group consisting of electron withdrawing radicals and mixtures of electron withdrawing radicals.

4,032,507
PLASTIC COMPOSITIONS

Arnold L. Anderson, Alma, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

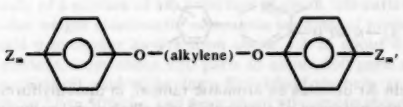
Filed Feb. 8, 1973, Ser. No. 330,809

The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.

Int. Cl.[2] C08L *25/06*

U.S. Cl. 260—45.75 R **15 Claims**

1. A plastic composition comprising a polystyrene and a flame retardant, said flame retardant consisting of a compound having the formula



wherein (a) Z is bromine; (b) *m* and *m'* are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

4,032,508
PLASTIC COMPOSITIONS

Arnold L. Anderson, Antioch, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

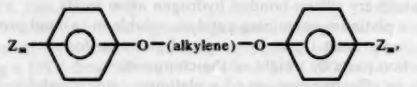
Continuation-in-part of Ser. No. 330,809, Feb. 8, 1973. This application Sept. 12, 1975, Ser. No. 612,740

The portion of the term of this patent subsequent to Apr. 5, 1994, has been disclaimed.

Int. Cl.[2] C08L *25/04*

U.S. Cl. 260—45.75 R **20 Claims**

1. A plastic composition comprising a three component system consisting of (1) polystyrene polymer, (2) a bisphenoxy compound, which functions as a flame retardant for said composition, having the formula



wherein (a) Z is bromine; (b) *m* and *m'* are independent and are integers having a value of 5 and (c) alkylene is a straight chain carbon group having from one to six carbon atoms, and (3) a flame retardant enhancing agent.

4,032,509
FIRE RETARDANT STYRENIC TERPOLYMER COMPOSITIONS

Yoon C. Lee, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 29, 1975, Ser. No. 644,493

Int. Cl.[2] C08K *3/22*, *3/38*, *5/06*

U.S. Cl. 260—45.75 B **9 Claims**

1. A molding composition comprising:

A. from 48 to 94 percent by weight based on the total weight of the molding composition of a polymer which is the interpolymerization product of:

1. from 55 to 90 percent by weight of a styrene monomer;
2. from 5 to 25 percent by weight of a maleic anhydride monomer; and
3. from 5 to 20 percent by weight of a brominated monomer selected from the group consisting of bromophenyl acrylates, bromophenyl methacrylates, bromoneopentyl acrylate and bromoneopentyl methacrylates, with the proviso that the amount of bromine in the polymer is at least 3 percent by weight;

B. from 3 to 12 percent by weight based on the total weight of the molding composition of a metal oxide;

C. from 3 to 25 percent by weight based on the total weight of the molding composition of a smoke suppressant which is selected from the group consisting of smoke suppressing hydrates, carbonates and borates; and

D. from 0 to 15 percent by weight of a brominated aromatic fire retardant additive.

4,032,510
NOVEL POLYCARBON STABILIZERS

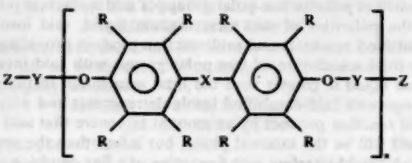
Joseph C. Floyd, Baytown, Tex., and Don A. Plank, Sarnia, Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 597,245, July 18, 1975, abandoned, which is a continuation-in-part of Ser. No. 441,457, Feb. 11, 1974, abandoned. This application Aug. 5, 1976, Ser. No. 711,705

Int. Cl.[2] C08J *3/20*

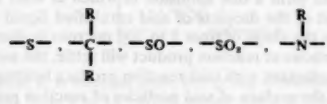
U.S. Cl. 260—45.85 S **26 Claims**

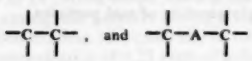
1. A composition of matter having the following structural formula:



wherein:

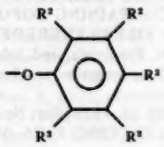
1. R is selected from the group consisting of —H, C_1–C_{18} alkyl groups, and an aryl group;
2. X is selected from the group consisting of





wherein A is a C_1–C_{18} alkylene or an arylene group;

3. Y is —C—;
4. Z is selected from the group consisting of



wherein R^2 is —H or a C_1–C_{18} alkyl group, and O—R^3 wherein R^3 is a C_1–C_{18} alkyl group; and

5. *n* is a value ranging from 1 to about 15.

4,032,511

PROCESS FOR THE PRODUCTION OF PHENOL SILICATE COMPOUNDS AND THEIR CONDENSATION PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 555,078, March 3, 1975, abandoned. This application Mar. 31, 1976, Ser. No. 672,559

Int. Cl.² C08G *77/04*

U.S. Cl. 260—46.5 R **16 Claims**

1. The process for the production of phenol silicate compounds and their resinous products by the following steps:

a. mixing about equal parts by weight of silicic acid and a phenol compound;

b. adding an alkali catalyst equal to 1 to 10% by weight of silicic acid and phenol compound;

c. heating said mixture to just below the boiling point of the phenol compound for 15 to 100 minutes while agitating, thereby

d. producing a granular phenol silicate compound.

4,032,512

PROCESS FOR THE PREPARATION OF POLYPHENYLENE ETHERS AT ELEVATED PRESSURE

James G. Bennett, and Glenn D. Cooper, both of Delmar, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 401,985, Oct. 1, 1973, abandoned. This application Apr. 1, 1975, Ser. No. 564,127

Int. Cl.² C08G *65/44*

U.S. Cl. 260—47 ET **11 Claims**

1. In a process for the preparation of a high-molecular weight polyphenylene ether having a degree of polymerization of at least 50 by oxidatively coupling a monovalent phenol having substitution in at least the two ortho positions and hydrogen or halogen in the para position using oxygen, a cupric halide and a primary or secondary amine catalyst as an oxidizing agent, the improvement which consists of carrying out the oxidation in a closed system with oxygen at a pressure between 25 and 300 psig.

4,032,513

PROCESS OF PRODUCING ALKENYLPHENOL POLYMERS

Hiroshi Fujiwara; Asao Takahashi, and Motomu Miyamoto, all of Soka, Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Filed Mar. 30, 1976, Ser. No. 671,927

Int. Cl.² C08G *33/10;* **C07C** *39/18;* **C08K** *5/16*

U.S. Cl. 260—47 UA **10 Claims**

1. A process of producing an alkenylphenol polymer which comprises cationically polymerizing an alkenylphenol in the presence of a nitrile using a cationic polymerization initiator, wherein said nitrile is a saturated aliphatic mononitrile or an aromatic nitrile having a boiling point below about 200° C at 760 mm Hg and the concentration of the alkenylphenol monomer in said nitrile solution is from about 1 to about 50% based on the weight of said nitrile.

4,032,514

OXYALKYLATED CYCLIC PHENOL-ALDEHYDE RESINS AND USES THEREFOR

Rudolf S. Buriks; Allen R. Fauke, and Franklin E. Mange, all of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

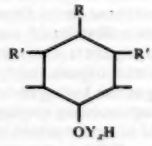
Continuation-in-part of Ser. No. 172,917, Aug. 18, 1971, abandoned. This application May 13, 1976, Ser. No. 686,094

Int. Cl.² C08G *8/12, 8/28*

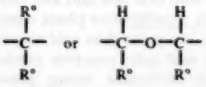
U.S. Cl. 260—51 EP **6 Claims**

1. An oxyalkylated, thioalkylated or aminoalkylated infusible cyclic phenol-aldehyde resin having a melting point above 300° C. and the idealized formula

where *n* is 4 to 16, 100 is



where A° is



and the A°s are the same or different, R is alkyl, alkenyl, aryl, cycloalkyl, heterocyclic, alkaryl, aralkyl, halo, alkoxy or phenoxy and the Rs are the same or different, R′ is hydrogen, alkyl, alkenyl, aryl, cycloalkyl, heterocyclic, alkaryl, aralkyl, halo, alkoxy or phenoxy and the R′s are the same or different, Y is AO, AS, AI or combinations or mixtures thereof, *x* is 1 to about 2000, AO being alkylene oxide, arylene oxide, alkarylene oxide, cycloalkene oxide or combinations or mixtures thereof, AS being alkylene sulfide, AI being alkyleneimine, I being NR″ where R″ is hydrogen, alkyl, cycloalkyl, aryl, aralkyl or alkaryl, and R° is hydrogen, alkyl, aryl, cycloalkyl,

alkaryl, aralkyl or heterocyclic and the R's are the same or different.

4,032,515
CURABLE RESORCINOL TERMINATED UREA-FORMALDEHYDE RESINS

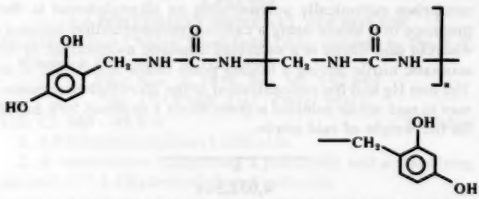
Elizabeth A. Blommers, Monroeville, and Roy H. Moult, Murrysville, both of Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 520,784, Nov. 4, 1974, abandoned, which is a continuation of Ser. No. 304,113, Nov. 6, 1972, abandoned. This application July 24, 1975, Ser. No. 598,728

Int. Cl.² C08G *14/08, 12/12, 12/40*

U.S. Cl. 260—70 R **6 Claims**

1. An adhesive comprising a resorcinol terminated urea-formaldehyde resin having the general formula:



where $\eta = 0$ to 10, said resin being cured under neutral or alkaline conditions by reacting it with a formaldehyde.

4,032,516
METHOD OF MAKING POLYURETHANE POWDER

John J. McGarr, Beverly, Mass., assignor to USM Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 358,476, May 9, 1973, Pat. No. 3,917,741, which is a continuation-in-part of Ser. No. 263,658, June 16, 1972, Pat. No. 3,817,886, which is a continuation-in-part of Ser. No. 278,611, Aug. 7, 1972, Pat. No. 3,787,525. This application July 17, 1975, Ser. No. 596,816

The portion of the term of this patent subsequent to Jan. 22, 1991, has been disclaimed.

Int. Cl.² C08G *18/08*

U.S. Cl. 260—77.5 AA **9 Claims**

1. The method for preparing polyurethane resins directly in finely divided form from reaction of a first liquid reactant comprising at least one organic polyisocyanate with a second liquid reactant comprising at least one organic compound containing at least two groups having active hydrogen to form a solid reaction product, said first reactant being employed in amount relative to the amount of said second reactant to give a molar ratio of active hydrogen to —NCO in the range of from about 0.85:1 to about 1.5:1, said method comprising emulsifying said reactants with the aid of an organic polymeric surfactant as fine droplets of said first reactant and fine droplets of said second reactant in a continuous phase comprising an organic liquid inert to and less polar than said reactants an in which said reactants and said solid reaction product are substantially insoluble, said surfactant being present in amount of from about 0.1% to about 10% on the weight of emulsified insoluble liquid reactants, reacting said emulsified reactants by reaction between the droplets of said first reactant and droplets of said second reactant emulsified in said inert organic liquid under conditions of vigorous agitation to form fine particles of said polyurethane separable from said inert liquid by settling, and separating said particles from said inert liquid, the molecules of said polymeric surfactant having an average molecular weight of at least about 2,000, and having polar groups which associate with the surface of said droplets of emulsified insoluble reactants and with particles of said solid reaction product and less-polar groups which are solvated by the said inert organic liquid, the quantity and the balance of polar to less-polar groups of said surfactant relative to the polarities of said inert organic liquid, said insoluble emulsified reactants and said reaction product providing that the total association of less polar groups with said inert organic liquid is greater than the total association of the polar groups with said emulsified insoluble reactants and with said solid reaction product by an amount to ensure that said inert liquid will be the external phase, but is less than the amount which would interfere with formation of a fine emulsion of the insoluble liquid reactants in said inert organic liquid, coordinating (a) the intensity of said agitation; (b) the quantity and the balance of polar to less-polar groups of said surfactant in said emulsion and (c) the polarities of said inert liquid organic liquid, said emulsified insoluble liquid reactants and said reaction product to form a fine emulsion in which at least about 95% by weight of the droplets of said emulsified liquid reactants will be in the range of from 1 to 300 microns in diameter so that the particles of reaction product will settle, the association of said surfactant with said reaction product holding said surfactant on the surface of said particles of reaction product to impede agglomeration of said particles.

4,032,517
PHOSPHORUS-CONTAINING COPOLYAMIDES AND FIBERS THEREOF

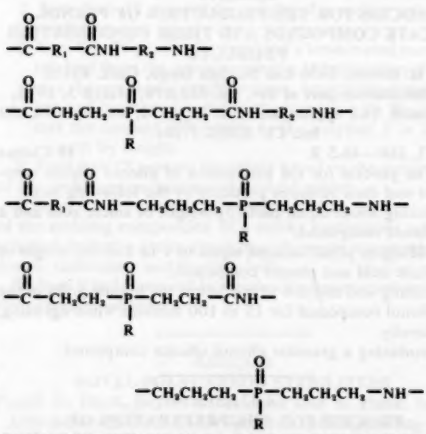
Oscar A. Pickett, Jr., Pensacola, and John W. Stoddard, Gulf Breeze, both of Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed July 22, 1975, Ser. No. 598,505

Int. Cl.² C08G *69/26, 69/42*

U.S. Cl. 260—78 R **8 Claims**

1. A fiber-forming copolyamide consisting essentially of recurring units selected from the group consisting of



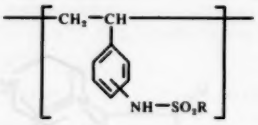
wherein R_1 and R_2 each represents a polymethylene radical having from 4 to 12 carbon atoms, and R represents an alkyl having from 1 to 4 carbon atoms, wherein successive R, R_1 and R_2 radicals when present in the polymer units may be the same or different and wherein the copolyamide contains a sufficient amount of units selected from units (II) to (IV) to provide a copolyamide containing between about 0.5 and about 7.5% by weight of phosphorus as an integral part of its polymer chain.

4,032,518
SULFONAMIDE COMPOUNDS AND POLYMERS DERIVED THEREFROM

Carl Kotlarchik, Jr.; Louis M. Minsk, and George L. Fletcher, Jr., all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 16, 1975, Ser. No. 541,678
Int. Cl.² C08F *28/00*
U.S. Cl. 260—79.3 M **13 Claims**

1. A polymer having as at least one repeating unit:



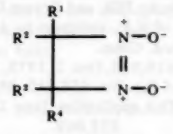
wherein R is selected from the group consisting of alkyl containing from 1 to 10 carbon atoms and aryl containing from 6 to 10 carbon atoms, said polymer having a molecular weight of about 800,000 to about 1,200,000 and an inherent viscosity at 25° C at a concentration of 0.25 gram of polymer per deciliter of solution in N,N-dimethylformamide of from 1 to 1.9.

4,032,519
DIAZACYCLOBUTANES

Edwin F. Ullman, Atherton, Calif., assignor to Syva Company, Palo Alto, Calif.

Continuation of Ser. No. 416,142, Nov. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 358,758, May 9, 1973, Pat. No. 3,953,444, which is a continuation-in-part of Ser. No. 196,724, Nov. 8, 1971, abandoned. This application May 1, 1975, Ser. No. 573,647
Int. Cl.² C07D *229/00*
U.S. Cl. 260—239 A **3 Claims**

1. A compound of the formula:



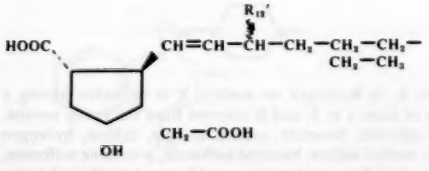
wherein R^{1-4} are the same or different and are monovalent aliphatic hydrocarbon radicals of from 1 to 12 carbon atoms of from 0 to 1 site of ethylenic unsaturation.

4,032,520
SYNTHESIS OF CYCLOPENTANOL

Frank Kienzle, 3 Brunnmattstrasse, Therwil, Switzerland, and Perry Rosen, 26 Sunset Drive, North Caldwell, N.J. 07006

Division of Ser. No. 381,322, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,633, Nov. 25, 1972, abandoned. This application Sept. 10, 1975, Ser. No. 611,957
Int. Cl.² C07C *177/00*
U.S. Cl. 260—240 R **2 Claims**

1. A compound of the formula



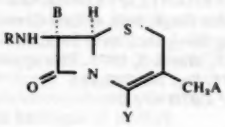
wherein R_{12}' is hydroxy or tetrahydropyranyloxy, benzyloxy, benzhydryloxy, trialkylsilyloxy, α-lower alkoxy-lower alkyloxy, 4-methoxy-5,6-dihydro-2H-pyranyloxy or trityloxy or enantiomers or racemates thereof.

4,032,521
CEPHALOSPORIN PHOSPHONIC ACID, SULFONIC ACID AND SULFONAMIDE COMPOUNDS

Burton G. Christensen, Metuchen, and Ronald W. Ratcliffe, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 319,946, Dec. 29, 1972, abandoned. This application Nov. 8, 1973, Ser. No. 410,831
Int. Cl.² C07D *501/38, 501/26*; A61K *31/545*
U.S. Cl. 260—243 C **9 Claims**

1. The compound having the structure:



wherein:

B is hydrogen or methoxy; A is selected from the group consisting of amino, acetamido, carbamoylamino, N,N-dimethylamino, N-(2-chloroethyl)amino, 5-cyanotriazol-1-yl, 4-methoxycarbonyltriazol-1-yl, pyridinium, 3-methylpyridinium, 4-methylpyridinium, 3-chloropyridinium, 3-bromopyridinium, 3-iodopyridinium, 4-carbamoylpyridinium, ; 4-(N-carbomethoxycarboxymethyl)pyridinium, 4-(hydroxymethyl)pyridinium, 4-(trifluoromethyl)pyridinium, quinolinium, picolinium and lutidinium;

R is an acyl radical of the formula:

wherein

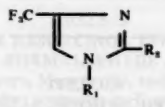
R^2 is hydrogen, chloro, bromo, fluoro, amono, guanidino, phosphono, hydroxy, tetrazolyl, carboxyl, sulfo, or sulfamino; R^3 is cyano, substituted or unsubstituted: phenyl, phenylthio, furyl, thienyl, thiazolyl, isothiazolyl, tetrazolyl, oxadiazolyl, and thiadiazolyl, wherein the ring substituent on R^3 is selected from the group consisting of chloro, bromo, fluoro, carboxymethyl, guanidino, guanidinomethyl, carboxyamidomethyl, aminomethyl, nitro, methoxy and methyl; and Y is a radical of the formula $PO(OH)_2$, PO(OH) (OR'') wherein R'' is lower-alkyl of 1–6 carbon atoms; SO_3 (OH); or SO_3NH_2; and non-toxic, pharmaceutically acceptable salts and esters.

4,032,522
2-PYRAZINYL-TRIFLUOROMETHYLIMIDAZOLES AND A METHOD FOR THEIR PREPARATION

John J. Baldwin, Lansdale, and Frederick C. Novello, Berwyn, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 456,102, March 29, 1974, abandoned, which is a division of Ser. No. 265,016, June 21, 1972, Pat. No. 3,818,014, which is a continuation-in-part of Ser. No. 885,362, Dec. 15, 1969, abandoned. This application Sept. 5, 1975, Ser. No. 610,904
Int. Cl.² C07D *241/04, 403/04*
U.S. Cl. 260—250 BN **3 Claims**

1. A compound of the formula:



and the nontoxic pharmacologically acceptable salts thereof; wherein R_1 is hydrogen, lower alkyl or monohydroxy-C_2-C_3 alkyl, and R_2 is pyrazinyl or mono-methoxy substituted pyrazinyl.

4,032,523

4-AMINO (OR HALO OR HYDROXY OR HYDRAZINO)-2-(PYRIDINYL)PYRIMIDINES

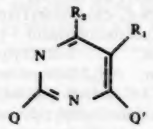
George Y. Lesher, and Baldev Singh, both of East Greenbush, N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 555,067, March 3, 1975. This application July 23, 1976, Ser. No. 708,195

Int. Cl.² C07D *401/04*

U.S. Cl. 260—256.4 N **10 Claims**

1. A compound of the formula



where Q is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents or N-oxide thereof, Q′ is hydroxy, halo, hydrazino or amino, R_1 is hydrogen, lower-alkyl or cyano, and R_2 is hydrogen, lower-alkyl, hydroxy or halo.

4,032,524

1-CARBAMOYL-5-FLUOROURACIL DERIVATIVES

Shoichiro Ozaki, Kamakura, and Haruki Mori, Yokohama, both of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

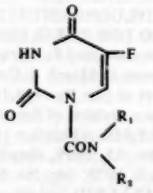
Continuation-in-part of Ser. No. 555,445, March 5, 1975, abandoned. This application Sept. 24, 1976, Ser. No. 726,196

Claims priority, application Japan, Apr. 26, 1974, 49-46617

Int. Cl.² C07D *239/10*

U.S. Cl. 260—256.4 C **6 Claims**

1. A 1-carbamoyl-5-fluorouracil represented by the formula



wherein R_1 represents methyl, ethyl, phenyl or cyclohexyl and R_2 represents hydrogen or is the same as R_1.

4,032,525

DIBENZ[b,f]OXEPIN DERIVATIVES

Max Gerecke; Emilio Kyburz, both of Reinach, Switzerland, and Jean-Pierre Kaplan, Le Plessis Robinson, France, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

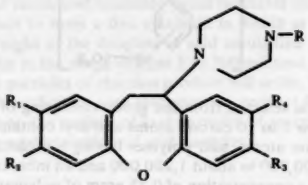
Filed Dec. 18, 1974, Ser. No. 534,033

Claims priority, application Switzerland, Jan. 4, 1974, 62/74; Nov. 20, 1974, 15369/74

Int. Cl.² C07D *403/04*

U.S. Cl. 260—268 TR **18 Claims**

1. A compound of the formula



wherein R is lower alkenyl, lower alkynyl, cyano-lower alkyl of 3–7 carbon atoms, hexadecanoyloxypropyl or hydroxy-lower alkynyl alkyl; one of R_1 and R_2 is hydrogen and the other is halogen, lower alkyl, lower alkoxy, lower alkylthio, trifluoromethyl or hydroxy; and one of R_3 and R_4 is hydrogen and the other is hydrogen, halogen, lower alkyl, lower alkoxy, lower alkylthio, trifluoromethyl or hydroxy, or a pharmaceutically acceptable acid addition salt thereof.

4,032,526

1,2-DIMETHYL-3 OR 5-PIPERAZINYL-PYRAZOLIUM SALTS

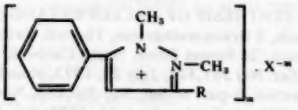
Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 619,093, Oct. 2, 1975, Pat. No. 3,988,348, which is a division of Ser. No. 558,610, March 14, 1975, Pat. No. 3,941,881. This application June 2, 1976, Ser. No. 692,069

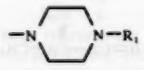
Int. Cl.² C07D *231/38*

U.S. Cl. 260—268 H **3 Claims**

1. A compound having the formula:



wherein R is a moiety represented by the structure:



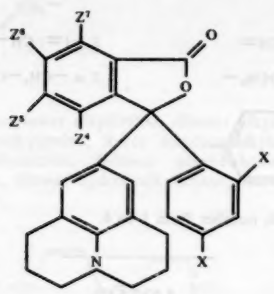
wherein R_1 is hydrogen or methyl; X is an anion having a charge of from 1 to 3, and is selected from the group consisting of chloride, bromide, iodide, acetate, sulfate, hydrogen sulfate, methyl sulfate, benzene sulfonate, p-toluene sulfonate, nitrate, phosphate, carbonate, perchlorate, tetrafluoroborate; and *m* is an integer from 1 to 3.

4,032,527
PHENYLJULOLIDINYLPHTHALIDES

Nathan N. Crounse, Cincinnati, and Paul J. Schmidt, Sharonville, both of Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 314,443, Dec. 12, 1972. This application Nov. 27, 1974, Ser. No. 527,757
Claims priority, application Canada, Dec. 5, 1973, 187401
Int. Cl.² C07D *215/38*
U.S. Cl. 260—287 P 6 Claims

1. 3-(2-X-4-X-Phenyl)-3-(9-julolidinyl)-4-Z⁴-5-Z⁵-6-Z⁶-7-Z⁷-phthalide of the formula



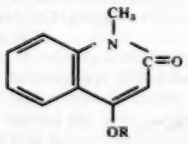
wherein:
X is dialkylamino wherein alkyl is non-tertiary alkyl of one to four carbon atoms;
Z⁴ is hydrogen or halo;
Z⁵ is hydrogen or halo; or non-tertiary alkyl of one to four carbon atoms, nitro, amino or dialkylamino wherein alkyl is non-tertiary alkyl or one to four carbon atoms when Z⁴, Z⁶ and Z⁷ are each hydrogen;
Z⁶ is hydrogen or halo; or non-tertiary alkyl of one to four carbon atoms, nitro, amino or dialkylamino wherein alkyl is non-tertiary alkyl of one to four carbon atoms when Z⁴, Z⁵ and Z⁷ are each hydrogen; and
Z⁷ is hydrogen or halo.

4,032,528
1,4-SUBSTITUTED-QUINOLIN-2(1H)-ONES AS CNS AGENTS

Goetz E. Hardtmann, Morristown, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 454,070, March 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 303,099, Nov. 2, 1972, abandoned, and Ser. No. 392,082, Aug. 27, 1973, abandoned. This application Sept. 18, 1975, Ser. No. 614,377
Int. Cl.² A61K *31/47*
U.S. Cl. 260—289 R 4 Claims

1. A compound of the formula:



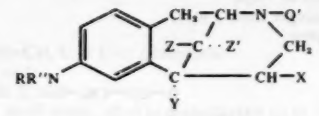
wherein R is alkyl of 4 to 6 carbon atoms.

4,032,529
AMINOMETHANOBENZAZOCINE INTERMEDIATES

Mark P. Wentland, North Greenbush, and Noel F. Albertson, Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

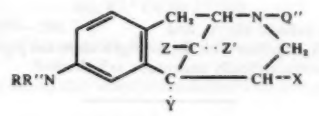
Division of Ser. No. 507,965, Sept. 20, 1974, Pat. No. 3,957,973. This application Nov. 24, 1975, Ser. No. 634,355
Int. Cl.² C07D *221/26*
U.S. Cl. 260—293.54 21 Claims

1. 1,2,3,4,5,6-Hexahydro-3-Q'-8RR''N-5-X-6-Y-11-Z-11-Z'-2,6-methano-3-benzazocine having the formula



wherein:
Q' is hydrogen, benzyl, propyl, isobutyl, neopentyl, allyl, 2-methyl-2-propenyl, 2-chloro-2-propenyl, cis-3-chloro-2-propenyl, cis-3-chloro-2-butenyl, trans-3-chloro-2-butenyl, propargyl, cyclopropylmethyl or (2,2-dichlorocyclopropyl)methyl;
R is hydrogen or methyl;
R'' is formyl, acetyl, propionyl, butyryl, isobutyryl, benzoyl or cyclopropanecarbonyl;
X is hydrogen, methyl or ethyl;
Y is hydrogen, methyl, ethyl, propyl, allyl or phenyl;
Z is hydrogen, methyl, ethyl or hydroxy; and
Z' is hydrogen, methyl or ethyl;
or an acid addition salt thereof.

10. 1,2,3,4,5,6-Hexahydro-3-Q''-8RR''N-5X-6-Y-11-Z-11Z'-2,6-methano-3-benzazocine having the formula



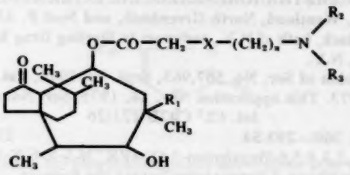
wherein:
Q'' is formyl, acetyl or Q* wherein Q* is propionyl, isobutyryl, pivaloyl, acryloyl, 2-methylacryloyl, 2-chloroacryloyl, cis-3-chloroacryloyl, cis-3-chlorocrotonoyl, trans-3-chlorocrotonoyl, propiolyl, cyclopropanecarbonyl or 2,2-dichlorocyclopropanecarbonyl;
R is hydrogen or methyl;
R'' is formyl, acetyl, propionyl, butyryl, isobutyryl, benzoyl or cyclopropanecarbonyl;
X is hydrogen, methyl or ethyl;
Y is hydrogen, methyl, ethyl, propyl, allyl or phenyl;
Z is hydrogen, methyl, ethyl or hydroxy; and
Z' is hydrogen, methyl or ethyl.

4,032,530
CERTAIN PLEUROMUTILINS

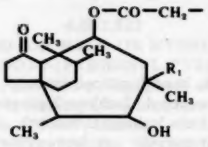
Helmut Egger, and Hellmuth Reinshagen, both of Vienna, Austria, assignors to Sandoz Ltd., Basel, Switzerland

Division of Ser. No. 427,514, Dec. 26, 1973, Pat. No. 3,919,290, which is a continuation-in-part of Ser. No. 294,642, Oct. 3, 1972, abandoned. This application Aug. 21, 1975, Ser. No. 606,430
Claims priority, application Switzerland, Oct. 5, 1971, 14450/71; Oct. 5, 1971, 14451/71; May 25, 1972, 7740/72; May 25, 1974, 7738/72; May 25, 1972, 7739/72
Int. Cl.² C07D *295/14*
U.S. Cl. 260—293.56 9 Claims

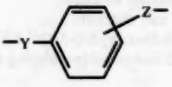
1. A compound of the formula:



wherein
R_1 is ethyl or vinyl,
n is an integer from 2 to 5,
X is sulphur,



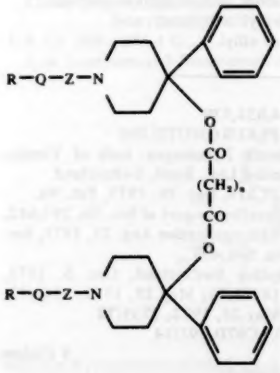
or $=N-R_4'$,
wherein
Y and Z are both sulphur, or one of Y and Z is oxygen and the other is sulphur, and
R_4' is hydrogen or



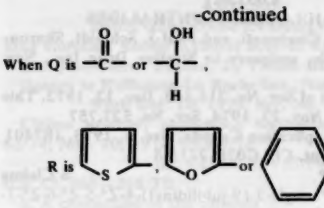
wherein
R_1 is as defined above, and
R_2 and R_3 together with the nitrogen atom are piperidino, or a pharmaceutically acceptabe salt thereof.

4,032,531
PIPERIDINE DERIVATIVES
William R. Hydro, Bel Air, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Dec. 3, 1969, Ser. No. 882,757
Int. Cl.² C07D *211/06*
U.S. Cl. 260—293.64 **7 Claims**

4. Compounds of the following formula

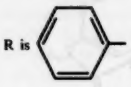


-continued



Z is alkylene group of 1 to 4 carbon atoms
n is a whole number from 1 to 4;

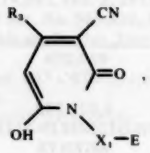
When Q is $-CH=$, Z is $(=)CH-CH_2-$,
Q is $-OCH_2-$, Z is $-CH_2-CH_2-$



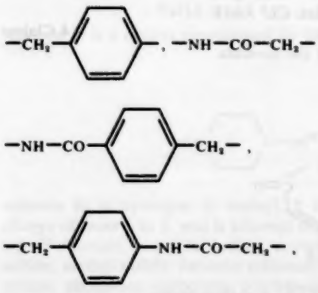
n is a whole number from 1 to 4.

4,032,532
1-AMINOALKYLENE-3-CYANO-4-METHYL-6-HYDROXY-1,2-DIHYDROPYRID-2-ONES
Hermann Burkhard, Neu-Allschwil; Roland Entschel, and Willy Steinemann, both of Basel, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland
Continuation-in-part of Ser. No. 824,297, May 13, 1969, abandoned. This application Mar. 1, 9173, Ser. No. 337,167
Claims priority, application Switzerland, Aug. 13, 1968, 12136/68
Int. Cl.² C07D *211/00*, *213/00*, *401/00*, *471/00*
U.S. Cl. 260—294.9 **26 Claims**

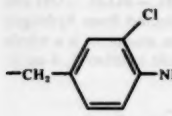
1. A compound of the formula

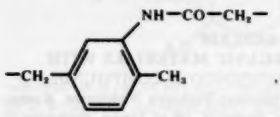


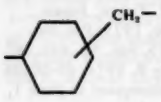
wherein
R_3 is alkyl of 1 to 12 carbon atoms, phenyl or benzyl,
X_1 is straight or branched chain alkylene of 1 to 12 carbon atoms,



-continued

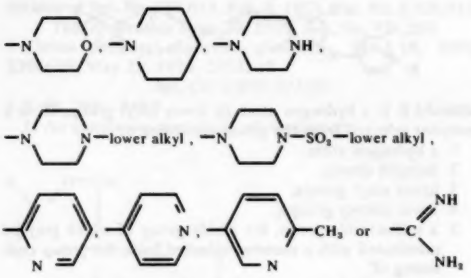






, and

E is amino, lower alkylamino, dilower alkylamino, lower hydroxyalkylamino, lower dihydroxyalkylamino, lower cyanoalkylamino, N-lower alkyl-N-lower cyanoalkylamino, dilower hydroxyalkylamino, dilower cyanoalkylamino,

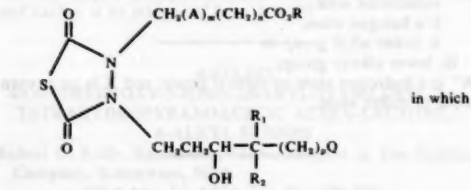


4,032,533
3,4-DISUBSTITUTED-1,3,4-THIADIAZOLINE-2,5-DIONES

Richard Merrill Scribner, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 19, 1976, Ser. No. 659,511
Int. Cl.² C07D *285/10*
U.S. Cl. 260—302 D 16 Claims

1. A compound having the formula



in which

in which

A is CH=CH, CH ≡ C or phenylene;

R is H, alkali metal, alkyl or cycloalkyl of up to 10 carbons, $NHC(CH_2OH)_3$ or $NR_3R_4R_5R_6$ in which

R_3 is H,

R_4, R_5 and R_6 individually are H, alkyl of 1–4 carbons or hydroxyalkyl of 2–4 carbons with the proviso that the total number of carbon atoms in R_4, R_5 and R_6 does not exceed 10;

m is 0 or 1;

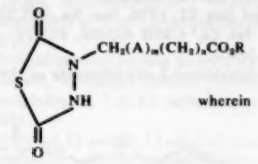
n is 2 to 6;

p is 90 to 6;

R_1 and R_2 individually are H, F or CH_3; and

Q is H, CH_3, CF_2CH_3 or CF_3.

13. A compound of the formula



wherein

wherein

A is CH=CH, C ≡ C or phenylene;

m is 0 or 1;

n is 2 to 6; and

R is H, alkali metal, alkyl or cycloalkyl of up to 10 carbons, $NHC(CH_2OH)_3$ or $NR_3R_4R_5R_6$ in which

R_3 is H;

R_4, R_5 and R_6 individually are H, alkyl of 1–4 carbons, or hydroxyalkyl of 2–4 carbons with the proviso that the total number of carbon atoms in R_4, R_5 and R_6 does not exeed 10.

4,032,534
CERTAIN 2-(2-THIOETHYL)THIAZOLIDINE-4-CARBOXYLIC ACIDS

Marc X. Chodkiewicz, Feucherolles, France, assignor to Ferlus-Chimie S.A., Cournon D'Auvergne, France

Continuation of Ser. No. 451,410, March 15, 1974, abandoned. This application Jan. 28, 1976, Ser. No. 653,093
Claims priority, application France, Mar. 22, 1973, 73.10266
Int. Cl.² C07D *277/06*
U.S. Cl. 260—306.7 C 8 Claims

1. 2-[2-(Carboxymethylthio)ethyl]thiazolidine-4-carboxylic acid.

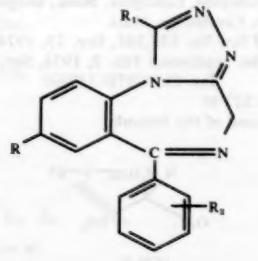
6. 2-[2-(Methylthio)ethyl]thiazolidine-4-carboxylic acid.

4,032,535
TRIAZOLOBENZODIAZEPINES

Rodney Ian Fryer, North Caldwell, and Armin Walser, West Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 419,563, Nov. 28, 1973, abandoned. This application Aug. 18, 1976, Ser. No. 715,606
Int. Cl.² C07D *487/14*
U.S. Cl. 260—308 R 2 Claims

1. A compound of the formula



wherein R is —NHOH; R_1 signifies hydrogen or lower alkyl;

R_2 signifies hydrogen or halogen;

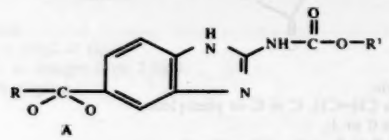
and the pharmaceutically acceptable acid addition salts thereof.

4,032,536
(1H-BENZIMIDAZOL-2-YL)CARBAMATES

Alfons H. M. Raeymaekers, Beerse, and Jozef H. L. Van Gelder, Tielen, both of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Filed July 22, 1976, Ser. No. 707,750
Int. Cl.² C07D *405/08*, *405/14*
U.S. Cl. 260—309.2 **7 Claims**

1. A (1H-benzimidazol-2-yl)carbamate of the formula:



A

wherein:
R is a member selected from the group consisting of phenyl, halophenyl and 2-thienyl;
R^1 is lower alkyl; and
A is an alkylene chain having the formula:

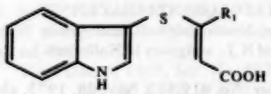
wherein *n* is in integer of from 0 to 1 inclusive, and R^2, R^3, R^4 and R^5 are each independently selected from the group consisting of hydrogen and lower alkyl.

4,032,537
INDOLOTHIOPYRONES

Richard E. Brown, East Hanover, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 468,349, May 9, 1974, Pat. No. 3,971,806. This application May 10, 1976, Ser. No. 684,618
Int. Cl.² C07D *209/04*
U.S. Cl. 260—326.12 R **5 Claims**

1. A compound of the formula III:



III

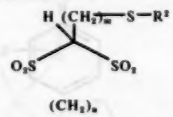
wherein R_1 represents hydrogen, lower alkyl or aryl.

4,032,538
1,3-DISULFONYLCYCLOALKANE

Richard B. Greenwald, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 535,205, Dec. 23, 1974, Pat. No. 3,958,992. This application Feb. 2, 1976, Ser. No. 654,290
Int. Cl.² C07D *339/08*
U.S. Cl. 260—327 M **9 Claims**

1. A compound of the formula



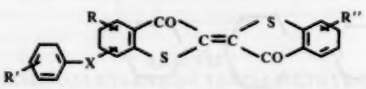
wherein R^2 is a hydrocarbon radical containing up to 20 carbon atoms selected from alkyl, aryl, alkaryl and aralkyl, said hydrocarbon radical being unsubstituted or substituted with a solubilizing group selected from —COOH, —SO_3H, —OH and —NR_1R_2 wherein R_1 and R_2 each is selected from hydrogen and lower alkyl containing 1 to 4 carbon atoms, *m* is a whole number 0, 1, 2, 3, 4 or 5 and *n* is a whole number 3, 4 or 5.

4,032,539
COLORING OF ORGANIC MATERIALS WITH ASYMMETRIC THIOINDIGOID COMPOUNDS

Michihiro Tsujimoto, Tachikawa; Tsutomu Nishizawa, Kamakura, and Ichiro Okubo, Hachioji, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Division of Ser. No. 573,102, April 30, 1975, Pat. No. 3,960,479. This application Dec. 16, 1975, Ser. No. 641,287
Claims priority, application Japan, May 9, 1974, 49-50686
The portion of the term of this patent subsequent to June 1, 1993, has been disclaimed.
Int. Cl.² C09B *7/00*
U.S. Cl. 260—331 **9 Claims**

1. Asymmetric thioindigoid compounds having the formula:



wherein R is a hydrogen atom or lower alkyl group; R′ is a member selected from the group consisting of

1. a hydrogen atom,
2. halogen atoms,
3. lower alkyl groups,
4. lower alkoxy groups,
5. a sulfonamide group, the amide group of which may be substituted with a member selected from the group consisting of
   - i. lower alkyl groups which may be substituted with
     - a. a hydroxyl group,
     - b. lower alkoxy group or
     - c. cyano group,
   - ii. a cyclohexyl group,
   - iii. aralkyl groups and
   - iv. a phenyl group which may be substituted with
     - a. a lower alkyl group,
     - b. chlorine atom or
     - c. lower alkoxy group, and
6. aryl sulfonate groups, the aryl group of which may be substituted with
   - i. a halogen atom,
   - ii. lower alkyl group or
   - iii. lower alkoxy group;

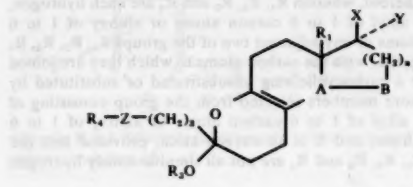
R″ is a hydrogen atom or methyl group; and X is an oxygen atom or sulfur atom.

4,032,540
BENZOPYRAN DERIVATIVES

Ulrich Eder; Gerhard Sauer; Gregor Haffer; Jürgen Ruppert, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Division of Ser. No. 367,509, June 6, 1973, Pat. No. 3,962,280. This application Mar. 5, 1976, Ser. No. 664,316
Claims priority, application Germany, June 8, 1972, 2228473; June 8, 1972, 2228475
Int. Cl.² C07D *317/44*
U.S. Cl. 260—340.5 **14 Claims**

1. A benzopyran of the formula



wherein -A-B- is >CH-CH$_2$— or >CH=CH-; *n* is the integer 1 or 2; R_1 R_2 each are lower alkyl; X is hydroxy, acyloxy wherein acyl is the acyl radical of a hydrocarbon carboxylic acid of 1–10 carbon atoms optionally substituted by phenyl or alkoxy of 1–10 carbon atoms optionally substituted by phenyl; Y is H or X and Y collectively are oxo; Z is arylene dioxy methylene; and R_4 is lower alkyl.

4,032,541
XANTHOGEN DISULPHIDES WITH FUNCTIONAL GROUPS

Rudolf Mayer-Mader, and Wilhelm Göbel, both of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Germany

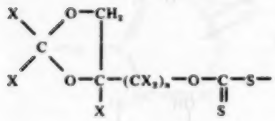
Division of Ser. No. 570,098, April 21, 1975, which is a division of Ser. No. 440,014, Feb. 6, 1974, Pat. No. 3,926,912. This application Sept. 20, 1976, Ser. No. 724,288

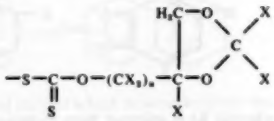
Claims priority, application Germany, Feb. 10, 1973, 2306610; May 23, 1973, 2352937

Int. Cl.² C07D *317/00*

U.S. Cl. 260—340.9 **2 Claims**

1. An xanthogen disulphide of the formula





wherein X may be the same or different and is selected from the group consisting of hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, naphthyl, benzyl, chlorine, bromine and iodine and each *n* is an integer of from 1 to 20.

4,032,542
4α,6-DIHYDROXY-5-IODO-2β-ARYLOXYMETHYL-3α-TETRAHYDROPYRANOACETIC ACID γ-LACTONE, 6-ALKYL ETHERS

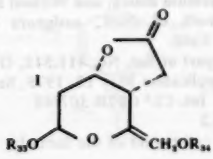
Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 14, 1976, Ser. No. 676,895

Int. Cl.² C07D *493/04*

U.S. Cl. 260—343.6 **2 Claims**

1. A thromboxane intermediate of the formula



wherein R_{34} is an arylmethyl hydroxy-hydrogen replacing group selected from the group consisting of

a. benzyl,
b. benzyl substituted by one to five alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive,
c. benzhydryl,
d. benzhydryl substituted by one to ten alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl to 7 to 12 carbon atoms, inclusive,
e. trityl, and
f. trityl substituted by one to 15 alkyl of one to four carbon atoms, inclusive, chloro, bromo, iodo, fluoro, nitro, phenylalkyl of 7 to 12 carbon atoms, inclusive;

and wherein R_{33} is alkyl of one to 5 carbon atoms, inclusive.

4,032,543
PG-TYPE 1,11-LACTONES

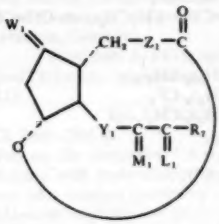
Gordon L. Bundy, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 589,724, June 23, 1975, abandoned. This application Mar. 29, 1976, Ser. No. 670,523

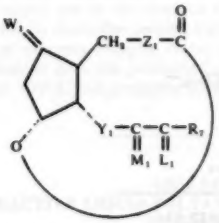
Int. Cl.² C07D *313/00, 321/00;* A01N *9/28*

U.S. Cl. 260—343.2 F **47 Claims**

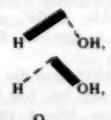
1. A prostaglandin-type, 1,11-lactone of the formula



or

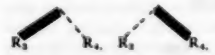


wherein W_1 is

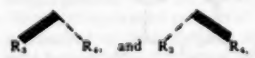


or ;

wherein L_1 is



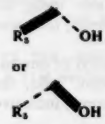
or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the

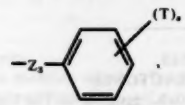
same or different, with the proviso that one of R_3 and R_4 is fluoro, only when the other is hydrogen or fluoro;

wherein M_1 is



wherein R_5 is hydrogen or methyl;

wherein R_7 is $-(CH_2)_m-CH_3$, wherein m is one to 5, inclusive, cis-CH=CH-CH_2-CH_3, or

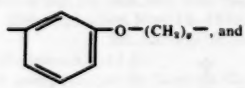


wherein T is chloro, fluoro, trifluoromethyl, alkyl of one to 3 carbon atoms, inclusive, or alkoxy of one to 3 carbon atoms, inclusive, the various T's being the same or different, s is zero, one, 2, or 3, and Z_3 is oxa or methylene, with the proviso that not more than two T's are other than alkyl, and the further proviso that Z_3 is oxa only when R_3 and R_4 are hydrogen or methyl, being the same or different;

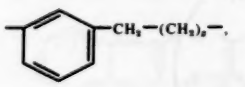
wherein Y_1 is trans-CH=CH-, $-CH_2CH_2-$, cis-CH=CH-, or $-C\equiv C-$; and

wherein Z_1 is

1. cis-CH=CH-CH_2-$(CH_2)_g$-CH_2-,
2. cis-CH=CH-CH_2-$(CH_2)_g$-CF_2-,
3. cis-CH_2-CH=CH-$(CH_2)_g$-CH_2-,
4. $-(CH_2)_3-(CH_2)_g-CH_2-$,
5. $-(CH_2)_3-(CH_2)_g-CF_2$,
6. $-CH_2-O-CH_2-(CH_2)_g-CH_2-$,



(7)



(8)

wherein g is 1 to 3, inclusive.

4,032,544

3-CYANO-4-HYDROXY COUMARIN DERIVATIVES

Frank Peter Doyle, Leatherhead; Barrie Christian Charles Cantello, Horsham; Derek Richard Buckle, Redhill and Harry Smith, Maplehurst, all of England, assignors to Beecham Group Limited, England

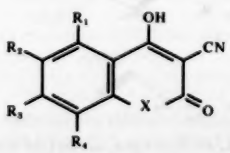
Division of Ser. No. 572,226, April 28, 1975, Pat. No. 4,012,407. This application June 28, 1976, Ser. No. 700,512

Claims priority, application United Kingdom, May 4, 1974, 19721/74

Int. Cl.² C07D *311/06*

U.S. Cl. 260—343.2 R **17 Claims**

1. A compound of the formula



or a pharmaceutically acceptable, nontoxic salt thereof or hydrate thereof, wherein R_1, R_2, R_3 and R_4 are each hydrogen, halogen, alkyl of 1 to 6 carbon atoms or alkoxy of 1 to 6 carbon atoms or any adjacent two of the groups R_1, R_2, R_3, R_4 taken together with the carbon atoms to which they are joined complete a carbocyclic ring unsubstituted or substituted by one or more members selected from the group consisting of halogen, alkyl of 1 to 6 carbon atoms or alkoxy of 1 to 6 carbon atoms, and X is an oxygen atom, provided that the groups R_1, R_2, R_3 and R_4 are not all simultaneously hydrogen atoms.

4,032,545

PHTHALIDES AND NAPHTHALIDES

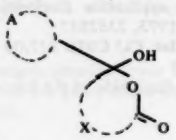
Alan L. Borror, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 617,300, Sept. 29, 1975, which is a continuation-in-part of Ser. No. 446,732, Feb. 28, 1974, Pat. No. 3,941,807, which is a continuation-in-part of Ser. No. 108,662, Jan. 21, 1971, abandoned. This application Nov. 5, 1976, Ser. No. 739,118

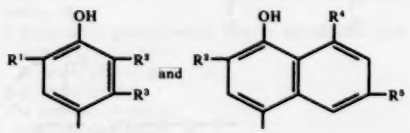
Int. Cl.² C07D *311/92, 307/88*

U.S. Cl. 260—343.2 R **10 Claims**

2. A compound of the formula:



wherein A is selected from



wherein R^1 is selected from hydrogen, alkoxy containing 1 to 3 carbon atoms and alkyl containing 1 to 3 carbon atoms; R^2 is selected from hydrogen, hydroxy, carboxy, sulfonamido, sulfamoyl, o-hydroxyphenyl, bis-trifluoromethylcarbinol, methoxy, alkyl containing 1 to 16 carbon atoms; R^3 is selected from hydrogen, alkoxy containing 1 to 18 carbon atoms and alkyl containing 1 to 3 carbon atoms; R^4 is selected from hydrogen, hydroxy and carboxy; R^5 is selected from hydrogen and alkoxy containing 1 to 18 carbon atoms; and X represents the carbon atoms necessary to complete a ring-closing moiety selected from phthalide, unsubstituted or substituted in the 4- or 7-position with carboxy, and naphthalide, unsubstituted.

4,032,546

BIS(BENZIL) TYPE COMPOUNDS CONTAINING ONE OR TWO FURAN MOIETIES

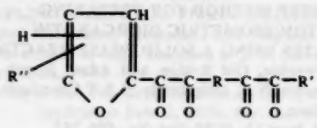
Robert J. Jones, Hermosa Beach, and Michael K. O'Rell, Manhattan Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Continuation-in-part of Ser. No. 411,512, Oct. 31, 1973, abandoned. This application May 12, 1975, Ser. No. 576,827

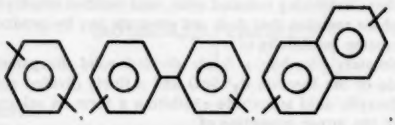
Int. Cl.² C07D *307/46*

U.S. Cl. 260—347.2 **1 Claim**

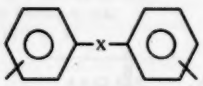
1. A bis(benzil) compound of the formula:



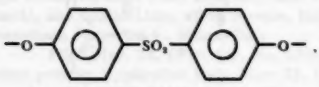
wherein R is a difunctional aromatic radical selected from the group consisting of



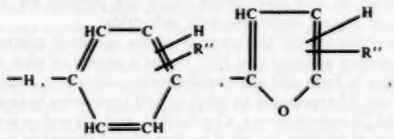
, and



where X is —S—, —O—, —SO_2—, —CO—,



—CH_2—, —C_2H_4—, and —C_3H_6—; R′ is a monofunctional radical selected from the group consisting of



and R″ is a monofunctional radical which is selected from the group consisting of —H, —CH_3, —C_2H_5, —C_3H_7, and —C_4H_9.

4,032,547

QUINONE ALKIDE SYNTHESIS SYSTEM

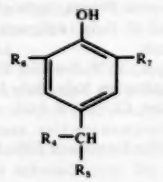
John D. Bacha, Monroeville, and Joseph S. Matthews, O'Hara Township, County of Allegheny, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Feb. 23, 1976, Ser. No. 660,718

Int. Cl.² C07C *49/64*

U.S. Cl. 260—396 N **11 Claims**

1. A process for preparing quinone alkides from the corresponding phenols which comprises contacting in aqueous solution at pH above 7 a phenol with a minor amount of a soluble iron cyanide salt in the range of about 0.01 mole to 1.0 mole per mole of phenol, a significant amount of a soluble persulfate salt in the range of about 0.1 mole to 1.5 moles per mole of phenol and a base said phenol having the formula:



wherein R_6 and R_7 are either alike or different, members selected from the group of

wherein R_1, R_2 and R_3 are either alike or different, members selected from the group consisting of hydrogen, straight or branched chain alkyl moieties having from 1 to 11 carbon atoms; phenyl and alkyl substituted phenyl moieties having up to 9 carbon atoms; alicyclic hydrocarbon moieties having from 3 to 6 carbon atoms; and wherein R_4 and R_5 are either alike or different, members selected from the group consisting of hydrogen, straight or branched chain alkyl moieties having from 1 to 18 carbon atoms, phenyl and alkyl substituted phenyl moieties having up to 9 carbon atoms, and alicyclic hydrocarbon moieties having from 3 to 6 carbon atoms, and the molar ratio of iron cyanide salt to persulfate salt being from about 0.02 to about 0.9.

4,032,548

PROCESS FOR PREPARING 1,4-NAPHTHOQUINONE

Manfred Martin, Cologne, and Gerhard Scharfe, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 9, 1975, Ser. No. 594,486

Claims priority, application Germany, Aug. 2, 1974, 2437221

Int. Cl.² C07C *49/66*

U.S. Cl. 260—396 R **2 Claims**

1. Process for preparing 1,4-naphthoquinone by reacting naphthalene with molecular oxygen in the gas phase in the presence of a catalyst consisting essentially of vanadium oxide, potassium sulphate and silicic acid which comprises, prior to the reaction of naphthalene with oxygen, treating the catalyst with molecular oxygen at 300 to 400° C in the presence of water vapor and in the absence of organic compounds and immediately thereafter passing a gas mixture consisting essentially of nitrogen, oxygen, water vapor, carbon dioxide and naphthalene over the pretreated catalyst at temperatures of 300° to 400° C and pressures from 3 to 8 atmospheres.

4,032,549

REACTIVE LIQUID POLYAMIDES FROM AMINE RESIDUES

Hubert J. Sharkey, and Robert Allan Winstel, both of Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Mar. 29, 1976, Ser. No. 671,325

Int. Cl.² C09F *5/00*; C07D *295/00*

U.S. Cl. 260—404.5 **9 Claims**

1. A liquid reactive polyamide composition having an amine value less than 200 and a 100° C viscosity in the range 1–80 poise comprising the reaction product of:

a. 70 to 100 equivalent percent of an amine residue obtained from the process for the hydrogenation of adiponitrile to hexamethylene diamine and containing 60 to 90 weight percent 1,2-diaminocyclohexane, 4–20 weight percent 2-methylpentamethylenediamine, 4 to 10 weight percent 2-(aminomethyl)-cyclopentylamine and up to 7 weight percent other nitrogen-containing by-products;

b. 70 to 100 equivalent percent of a polybasic acid which is a branched or straight-chain, aliphatic or cycloaliphatic acid having 18 to 72 carbon atoms and 2 to 4 carboxyl groups;

c. 0 to 30 equivalent percent of a branched or unbranched, aliphatic or cycloaliphatic mono- or dicarboxylic acid containing 2 to 28 carbon atoms; and

d. 0 to 30 equivalent percent of a mono- or polyfunctional aliphatic or aromatic amine containing 2 to 20 carbon atoms of heterocyclic amine selected from the group consisting of morpholine, piperazine, aminoethylpiperazine, 1,4-piperazine-bispropylamine, 1,3-di(4-piperidyl)-propane, 1,4-di(4-piperidyl)butane, 1,2-di(4-piperidyl)ethane, N-aminoethylpiperazine and N-aminopropylpiperazine.

4,032,550
PROCESS FOR THE PRODUCTION OF ESTERS

John F. White, and Jerome C. Bertrand, both of Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

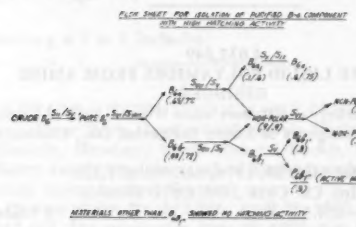
Filed Nov. 26, 1975, Ser. No. 635,468
Int. Cl.² C09F 5/08, 7/10; C11C 3/00
U.S. Cl. 260—410.6 12 Claims

1. A process for the batch, continuous or semicontinuous preparation of carboxylic acid esters by direct esterification of a carboxylic acid or anhydride with an alcohol or by ester interchange of a carboxylic acid ester with another carboxylic acid ester, an alcohol or carboxylic acid which method comprises heating the reactants in a liquid state at a temperature between 100° C and 300° C in the presence of at least 0.005 weight percent, based on the reactants, of an immobilized supported transition metal catalyst containing from about 3 to 60 weight percent of a transition metal selected from Groups IVb, Vb and VIb, said transition metal being present on and bound to a support matrix by bridging oxygen linkages as a polymeric cross-linked network wherein the transition metal atoms are bonded to each other by bridging oxygen linkages.

4,032,551
METHOD OF OBTAINING NEUTRAL LIPID MATERIAL USED AS A HATCHING AGENT FOR SUGAR BEET NEMATODE

James D. Willett, Moscow, and Luther Michael Cheek, Genesee, both of Idaho, assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 442,857, Feb. 15, 1974, Pat. No. 3,956,485. This application Jan. 7, 1976, Ser. No. 647,202
Int. Cl.² L11B 1/10; A01N 9/02, 9/08
U.S. Cl. 260—412.4 1 Claim



1. A method of obtaining a neutral lipid material from sugar beet plants, said neutral lipid material evidencing hatching activity with respect to the cyst of sugar beet nematodes which comprises extracting macerated sugar beet with a selective solvent selected from the group consisting of methanol and chloroform or a mixture thereof to dissolve or extract lipid material therefrom and chromatographically fractionating the resulting extracted lipid material to separate a terpenoid-containing neutral lipid material, the terpenoid contained in said neutral lipid material having a molecular weight of about 255, about 410 or about 435.

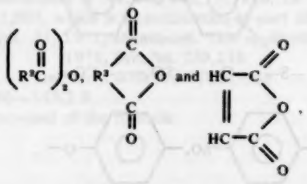
4,032,552
ONE STEP METHOD FOR PREPARING NON-STOICHIOMETRIC DIORGANOTIN CARBOXYLATES USING A SOLID PHASE REACTION

Robert Dally Dworkin, Old Bridge, and Adam Joseph Ejk, Piscataway, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Filed June 12, 1975, Ser. No. 586,252
Int. Cl.² C07F 7/22; C08K 100; C11C 1/00
U.S. Cl. 260—414 6 Claims

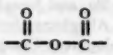
1. A method for preparing non-stoichiometric diorganotin carboxylates exhibiting reduced odor, said method employing a solid phase reaction that does not generate any by-products and consisting essentially of

1. intimately blending a finely divided solid diorganotin oxide of the formula R_2^1 SnO and a finely divided solid carboxylic acid anhydride exhibiting a formula selected from the group consisting of



wherein the particle size of the diorgano tin oxide and carboxylic acid anhydride is uniformly small and does not exceed 0.063 inch (0.16 cm.) and wherein from 1.1 to 6 moles of said diorganotin oxide are present for every mole of said carboxylic acid anhydride;

2. maintaining the temperature of the resultant mixture at between ambient and 100° C. for a period of time sufficient to form said non-stoichiometric diorganotin carboxylate; R^1 represents an alkyl radical containing between 1 and 20 carbon atoms, a cycloalkyl, aryl, alkaryl or aralkyl radical wherein the alkyl residue of said alkaryl or aralkyl residue contains between 1 and 12 carbon atoms, R^2 represents an alkyl radical containing between 12 and 20 carbon atoms, an aryl, alkaryl or aralkyl radical wherein the alkyl residue of said alkaryl or aralkyl radical contains between 1 and 12 carbon atoms, R^3 is selected from the group consisting of alkylene radicals containing between 2 and 12 carbon atoms, 1,2-cycloalkenyl and o-phenylene radicals, wherein the carbon atoms of the



radical are bonded to adjacent carbon atoms of said alkylene radical.

4,032,553
ALUMINIUM HYDRIDE OLIGOMER DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Giovanni Dozzi; Giovanni Perego, both of Milan, and Carlo Busetto, Padova, all of Italy, assignors to Snam Progetti S.p.A., Milanese, Italy

Filed July 1, 1975, Ser. No. 592,247
Claims priority, application Italy, July 1, 1974, 24662/74
Int. Cl.² C07F 5/06
U.S. Cl. 260—448 R 3 Claims

1. A compound of the formula of FIG. 1 wherein R is tert-butyl.

4,032,554

COUPLING AGENT FOR FIBROUS GLASS SUBSTRATES

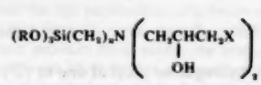
Richard G. Adams, Montclair, and Stephen B. Sello, Cedar Grove, both of N.J., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Division of Ser. No. 412,943, Nov. 5, 1973, abandoned. This application Feb. 2, 1976, Ser. No. 654,324

Int. Cl.² C07F 7/10, 7/18

U.S. Cl. 260—448.8 R 2 Claims

1. A compound of the formula



wherein

R is alkyl of 1 to 5 carbon atoms,

X is chlorine or bromine, and

n is an integer of 1 to 4.

4,032,555

PROCESS FOR THE CARBOXYLATION OF ORGANIC SUBSTRATES WITH CARBON DIOXIDE

Giorgio Bottaccio; Gian Paolo Chiusoli; Enzo Alneri; Marcello Marchi, and Giulio Lana, all of Novara, Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

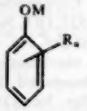
Filed Mar. 24, 1976, Ser. No. 670,010

Claims priority, application Italy, Mar. 28, 1975, 21816/75

Int. Cl.² C07C 51/15, 59/32, 59/36, 121/66

U.S. Cl. 260—465 D 5 Claims

1. A process for the carboxylation of organic substrates or reactants containing at least one active hydrogen atom, and selected from the class consisting of ketones, esters, nitroparaffins and nitriles, by reaction with CO_2 and alkaline phenates in an organic medium, characterized in that the reaction is conducted in the presence of an alkaline phenate in an organic medium which is at least a partial solvent for the phenate, and selected from the class consisting of tetrahydrofurane, dioxane, tetrahydropyran, ethyl acetate, propylenecarbonate, triethylamine, N-methylmorpholine, a picoline, a lutidine, 2-methyl-5-ethyl-pyridine, and sulpholane, and at a temperature between about 40° and 60° C; the alkaline phenate being selected from the class consisting of the Li, Na, K salts of phenols of the general formula:



wherein R is hydrogen or an alkyl or an alkoxy group, linear or branched, having up to 20 carbon atoms, or a phenyl group, *n* varies from 1 to 5, and M is Li, Na or K.

4,032,556

METHANATION OF GASES

Reginald George Sinclair Banks, Solihull, England, assignor to The Gas Council, London, England

Continuation of Ser. No. 307,141, Nov. 16, 1972, abandoned. This application Nov. 13, 1974, Ser. No. 523,410

Claims priority, application United Kingdom, Nov. 23, 1971, 54823/71; July 12, 1972, 32599/72

Int. Cl.² C07C 27/06

U.S. Cl. 260—449 M 2 Claims

1. A method for the production of a fuel gas by methanation of a gas comprising contacting a gas produced by the hydrogenation of liquid hydrocarbon feedstocks with a hydrogenation gas at high temperature, said gas containing methane, ethane, carbon monoxide, carbon dioxide, and hydrogen, with a hydrogenation catalyst selected from the group consisting of nickel-alumina-silica, nickel magnesia, nickel-chromia, nickel-urania-alumina, nickel silica and cobalt silica at elevated pressure and at an elevated temperature such that hydrogenation of carbon oxides present in the reactants is substantially complete at a temperature below that necessary for the hydrogenation of ethane.

4,032,557

PROCESS FOR PREPARING ORGANOSILOXANES

Helmut Spörk, Altotting; Rudolf Strasser, Burghausen; Rudolf Riedle, Burghausen; Wolfgang Jacques, Burghausen, and Johann Waas, Burghausen, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Apr. 26, 1976, Ser. No. 680,309

Claims priority, application Germany, May 15, 1975, 2521742

Int. Cl.² C07F 7/08, 7/18

U.S. Cl. 260—448.2 E 6 Claims

1. An improved process for preparing organosiloxanes and alkyl halides by introducing an organohalosilane and alkanol having from 1 to 2 carbon atoms into a reactor containing at least one layer of packing material which is maintained at a temperature of from 60° to 150° C to form an aqueous phase containing organosiloxanes, and thereafter separating the organosiloxanes from the aqueous phase, the improvement which comprises (1) recycling into the reactor from 1 to 6 liters of the aqueous phase for each mol of the organohalosilane introduced into the reactor and (2) reacting the organosiloxanes separated from the aqueous phase with from 2 to 10 percent by weight based on the weight of the organosiloxanes with the same organohalosilane used in the initial reaction.

4,032,558

PARA-PHENYL STILBENE DERIVATIVES

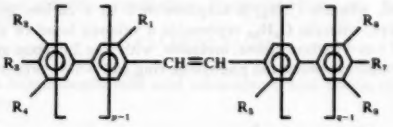
Fritz Fleck, Bottmingen; Hans Kittl, Riehen, and Salvatore Valenti, Bottmingen, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 316,448, Dec. 19, 1972, abandoned. This application July 16, 1975, Ser. No. 596,287

Int. Cl.² C07C 121/64, 121/75

U.S. Cl. 260—465 H 4 Claims

1. A compound of the formula,



in which

R_1 and R_5 are each hydrogen, nitrile or methyl,

R_2, R_3, R_4, R_6, R_7 and R_8 are each hydrogen, fluorine, chlorine, methyl, methoxy, alkenyl of 2 to 4 carbon atoms, or nitrile, and

p and *q* are integers from 1 to 3, with the provisos that the total of *p* and *q* is 4, 5 or 6,

the total of *p* and *q* and the number of nitrile substituents is at least 5, and at least 1 of R_1, R_3, R_5 and R_7 is nitrile.

4,032,559

N,2-DICYANOACETIMIDATES

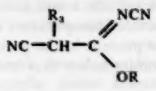
John M. McCall, and Joseph J. Ursprung, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed July 28, 1975, Ser. No. 599,912

Int. Cl.² C07D 121/16

U.S. Cl. 260—465.5 R 3 Claims

1. A compound of the formula



wherein

R is selected from the group consisting of alkyl of one to six carbon atoms, inclusive, and cycloalkyl of five to seven carbon atoms, inclusive;

R_3 is selected from the group consisting of hydrogen, alkyl of one to six carbon atoms, inclusive, alkenyl of two to six carbon atoms, inclusive, cycloalkyl of five to eight carbon atoms, substituted or unsubstituted with one to three alkyl groups, said alkyl group having from one to three carbon atoms, inclusive, alkyl being the same or different if two or three alkyl groups, and phenylalkyl wherein alkyl is from one to six carbon atoms, inclusive.

4,032,560

OXA PHENYLENE PROSTAGLANDIN ANALOGS

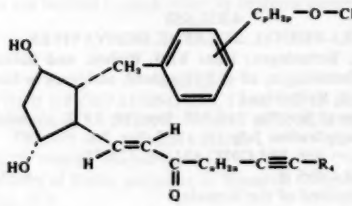
Douglas R. Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 604,159, Aug. 13, 1975, Pat. No. 3,997,566, which is a continuation-in-part of Ser. No. 552,707, Feb. 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 488,295, July 12, 1974, abandoned. This application July 26, 1976, Ser. No. 708,406

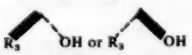
Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 G **3 Claims**

1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein C_nH_{2n} is alkylene of 1 to 4 carbon atoms, inclusive, wherein C_pH_{2p} represents a valence bond or alkylene of 1 to 4 carbon atoms, inclusive, with 1 or 2 carbon atoms in the chain between the phenylene ring and —O—; wherein Q is



wherein R_5 is hydrogen or alkyl of 1 to 4 carbon atoms, inclusive; wherein R_4 is alkyl of 1 to 4 carbon atoms, inclusive, substituted with zero, 1, 2, or 3 fluoro; and wherein R_1 is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with 1, 2, or 3 chloro or alkyl of 1 to 4 carbon atoms, inclusive.

4,032,561

17-PHENYL-18,19,20-TRINOR-CIS-4,5-DIDEHYDRO-$PGF_{1\alpha}$ COMPOUNDS

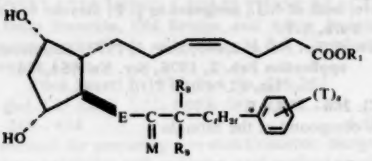
Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed May 27, 1975, Ser. No. 580,747

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 A **7 Claims**

1. An optically active compound of the formula:



or a racemic form of that compound and the enantiomer thereof,

wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2 or 3 chloro or alkyl of one to 4 carbon atoms, inclusive;

wherein M is R_2 OH or R_2 OH, wherein R_2 is hydrogen, methyl, or ethyl;

wherein E is trans—CH=CH— or $-CH_2CH_2-$;

wherein R_8 is hydrogen and R_9 is hydrogen, methyl, or fluoro, or wherein R_8 and R_9 are both methyl or both fluoro, with the proviso that neither of R_8 and R_9 is methyl when R_2 is methyl or ethyl;

wherein C_fH_{2f} represents a valence bond or alkylene of one to 9 carbon atoms, inclusive, with one to 6 carbon atoms, inclusive, between $-CR_8R_9-$ and the ring;

wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_3$, wherein R_3 is alkyl of one to 4 carbon atoms, inclusive and wherein s is zero, one, 2, or 3 with the proviso that not more than 2 T's are other than alkyl; including alkanoates of 2 to 8 carbon atoms, inclusive, and pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,032,562

3,5-DIALKYL-4-HYDROXYPHENYLALKANOIC ACID ESTERS OF POLYALKYLENE GLYCOLS

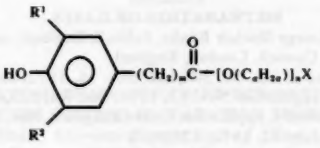
Martin Dexter, Briarcliff Manor; John D. Spivack, Spring Valley, and David Herbert Steinberg, Bronx, all of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 521,107, Nov. 5, 1974, abandoned, which is a continuation of Ser. No. 402,492, Oct. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 159,020, July 1, 1971, abandoned. This application Oct. 24, 1975, Ser. No. 625,414

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 S **4 Claims**

1. A compound of the formula



wherein each of R^1 and R^2 is a (lower) alkyl group of from one to four carbon atoms;

X is hydroxy or alkoxy containing from 1 to 2 carbon atoms; and

a is an integer of from 2 to 6,

n has a value of from 3 to 8,

m is 1 or 2.

4,032,563
PROCESS FOR THE RECOVERY OF HIGH PURITY DIESTERS OF TEREPHTHALIC OR ISOPHTHALIC ACIDS

Jon J. Harper, Naperville; Antonio E. Navarrete, Downers Grove, both of Ill., and Richard J. Thomas, Huntington Beach, Calif., assignors to Standard Oil Company, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,193
Int. Cl.² C07C *69/80, 69/82*
U.S. Cl. 260—475 R **23 Claims**

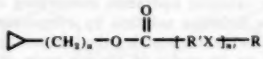
1. In a process for the production of a lower alkyl diester of a phenylene dicarboxylic acid in an esterification zone wherein reaction product from said zone is cooled thus rendering a mass of lower alkyl diester and mother liquor containing impurities characterized as high boiling organics and methyl esters of carboxybenzaldehyde and toluic acid, wherein an improvement comprises:
   1. Oxidation treatment of mother liquor with molecular oxygen at a temperature in the range of from about 180° to about 250° C. to form a product termed oxidized mother liquor and return of part of said oxidized mother liquor to the esterification zone;
   2. Evaporation treatment of another part of said oxidized mother liquor to effect production of low boiling overhead product and high boiling bottoms product containing said high boiling organics;
   3. Return of overhead product to the esterification zone and removal of high boiling bottoms product from the process.

4,032,564
ESTERS OF CYCLOPROPYLALKANOLS

Clive A. Henrick, and Gerardus B. Staal, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 504,223, Sept. 9, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,401
Int. Cl.² C07C *69/67, 69/73, 149/20*
U.S. Cl. 260—481 R **8 Claims**

1. Compounds selected from those of formula I



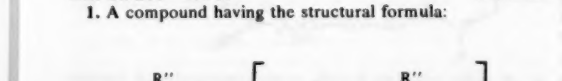
wherein,
R is alkyl of one to eighteen carbon atoms, alkenyl of two to eighteen carbon atoms, or alkynyl of two to eighteen carbon atoms;
R′ is methylene or ethylene;
X is oxygen or sulfur;
n is an odd integer between one and thirteen; and
n′ is one, two, or three;
with the proviso that each compound contains at least twelve carbon atoms in the molecule.

4,032,565
CROSS-LINKABLE COMPOUNDS

David John Kilpatrick, Leeds; Trevor Shaw, Ilkley, and David Malcolm Lewis, Otley, all of England, assignors to I.W.S. Nominee Company Limited, London, England

Filed July 22, 1974, Ser. No. 490,669
Claims priority, application United Kingdom, July 27, 1973, 35882/73; July 27, 1973, 35883/73; July 27, 1973, 35884/73
Int. Cl.² C07C *149/20*
U.S. Cl. 260—481 R **6 Claims**

1. A compound having the structural formula:



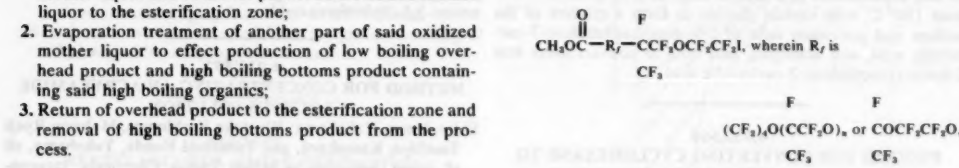
wherein R′ is an alkylene group; R″ is a thiol group; x is at least 1; $C_mH_{2m}O$ is a straight chain oxyalkylene group; *n* is greater than 1, and *m* is at least 3.

4,032,566
OMEGA-CARBOMETHOXYPERFLUOROALKYLENE OXIDE IODIDES

Theodore Psarras, Gainesville, Fla., and Christ Tamborski, Dayton, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 4, 1975, Ser. No. 610,471
Int. Cl.³ C07C *69/66*
U.S. Cl. 260—484 R **4 Claims**

1. Fluorinated ethers having the following formula:



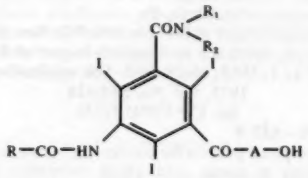
where *n* is zero to 10, inclusive.

4,032,567
TRIIODOISOPHTHALIC ACID MONOAMINO ACID AMIDES, PROCESS FOR THE PREPARATION THEREOF, AND USE THEREOF AS X-RAY CONTRAST MEDIA

Erich Klieger; Wolfgang Beich, and Eberhard Schroder, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Division of Ser. No. 331,110, Feb. 9, 1973, Pat. No. 3,953,501. This application Mar. 3, 1975, Ser. No. 555,043
Claims priority, application Germany, Feb. 16, 1972, 2207950
Int. Cl.² C07C *101/68*
U.S. Cl. 260—519 **9 Claims**

1. A triiodoisophthalic acid monoamino acid amide of the formula



where A is a divalent amino lower alkanoyl linked to the carboxyl group via the amino acid nitrogen;
R is alkyl, hydroxyalkyl or alkoxyalkyl of 1–6 carbon atoms;
R_1 and R_2 are each hydrogen, alkyl of 1–6 carbon atoms or hydroxyalkyl of 2–6 carbon atoms, or R_1 and R_2 together with the nitrogen atom to which they are bonded form a 5 to 7 member heterocyclic ring which can contain a further oxygen or nitrogen hetero atom:
and the physiologically acceptable salts thereof.

4,032,568

PRODUCTION OF 2-HYDROXYNAPHTHALENE-3-CARBOXYLIC ACID

Hans-Juergen Quadbeck-Seeger, and Helmut Hoch, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 476,151, June 3, 1974, abandoned. This application Sept. 24, 1975, Ser. No. 616,446

Claims priority, application Germany, June 23, 1973, 2332064

Int. Cl.² C07C *51/15*

U.S. Cl. 260—520 A 4 Claims

1. A process for the production of 2-hydroxynaphthalene-3-carboxylic acid which comprises heating β-naphthol and an aqueous solution of potassium hydroxide and of sodium hydroxide in a molar ratio of said respective hydroxides in the range of 0.02:1 to 0.5:1 to produce a mixture of sodium β-naphtholate and potassium β-naphtholate containing 0.02 to 0.5 mol of potassium β-naphtholate per mol of sodium β-naphtholate, in a first stage to a temperature of at least 180° C. in the absence of a solvent, then reacting said heated mixture of said naphtholates in a second stage at a temperature of at least 180° C. with carbon dioxide to form a mixture of the sodium and potassium salts of 2-hydroxynaphthalene-3-carboxylic acid, and acidifying said salts to convert them into 2-hydroxynapthalene-3-carboxylic acid.

4,032,569

PROCESS FOR CONVERTING CYCLOHEXANE TO ADIPIC ACID

Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed July 14, 1975, Ser. No. 595,374

Int. Cl.² C07C *51/20*

U.S. Cl. 260—533 C 10 Claims

1. A process for converting cyclohexane to adipic acid in a system consisting essentially of cyclohexane, an aliphatic monobasic acid solvent, cobaltic ions and molecular oxygen, which comprises subjecting cyclohexane to oxidation with oxygen in the presence of cobaltic ions in an aliphatic monobasic acid having only primary and secondary hydrogen atoms and having two to eight carbon atoms, wherein at least about 25 millimols of cobalt are present per mol of cyclohexane, while maintaining a temperature of about 85° to about 105° C. and an oxygen partial pressure of at least about 150 pounds per square inch absolute for a period of about 0.5 to about 3 hours.

4,032,570

PROCESS FOR CONVERTING BUTANE TO ACETIC ACID

Johann G. D. Schulz, Pittsburgh, Pa., and Richard Seekircher, North Bay, Canada, assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 196,732, Nov. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 821,096, May 1, 1969, abandoned. This application July 23, 1975, Ser. No. 598,426

Int. Cl.² C07C *51/20*

U.S. Cl. 260—533 R 9 Claims

1. A liquid-phase process for converting butane to a product predominating in acetic acid which comprises contacting butane with a gas containing molecular oxygen in the presence of a lower fatty acid and a cobalt compound soluble in the reaction mixture in amounts corresponding to about 0.5 to about 20 percent by weight of cobalt, based on said lower fatty acid, at a temperature of about 200° to about 250° F., said cobalt compound being the effective catalyst employed and containing solely cobalt as the metallic component, while maintaining in the reaction zone all of the components of the reaction mixture, including the water of reaction, throughout the reaction period until termination of the reaction.

4,032,571

MANUFACTURE OF 2-AMINO-3,5-DINITROBENZAMIDE

Hans-Juergen Quadbeck-Seeger, Bad Duerkheim, and Dieter Schneider, Edingen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Apr. 18, 1975, Ser. No. 569,270

Claims priority, application Germany, May 8, 1974, 2422239

Int. Cl.² C07C *102/02*

U.S. Cl. 260—558 A 4 Claims

1. A process for the manufacture of 2-amino-3,5-dinitrobenzamide which comprises nitrating at −20° C to 80° C isatoic anhydride dissolved in an inert organic solvent with an acid mixture consisting of 85–100% strength nitric acid and oleum, said acid mixture containing 0.5 to 20 moles of sulfur trioxide per mole of nitric acid, to produce 3,5-dinitroisatoic anhydride, allowing the reaction mixture to separate into an organic phase and an acid phase containing the 3,5-dinitroisatoic anhydride, adding 20–30% strength aqueous ammonia to the resultant acid phase in an amount of 9 to 25 moles of ammonia per mol of isatoic anhydride, and reacting the ammonia and the acid phase to produce a high yield of 2-amino-3,5-dinitrobenzamide.

4,032,572

METHOD FOR CONCENTRATING AN ACRYLAMIDE AQUEOUS SOLUTION

Shiro Asano, Yokohama; Kiyotaka Yoshimura, Mobara; Ryoji Tsuchiya, Kamakura, and Tadatoshi Honda, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Continuation-in-part of Ser. No. 529,450, Dec. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 311,830, Dec. 4, 1972, Pat. No. 3,917,693. This application Dec. 3, 1975, Ser. No. 637,416

Claims priority, application Japan, Dec. 6, 1971, 46-97895

The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.

Int. Cl.² C07C *103/08*

U.S. Cl. 260—561 N 8 Claims

1. Method for concentrating acrylamide aqueous solutions obtained from catalytic hydration comprising concentrating the acrylamide aqueous solution by evaporating the water content thereof while maintaining the said solution on contact with from 0.1 to 30 moles of air per mole of water being evaporated at a temperature of between 55° and 120° C and a pressure of between 200 and 1470 mmHg.

4,032,573

ORTHO-ACYLATED ANILIDE DERIVATIVES AND SALTS THEREOF

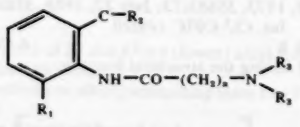
Shinichi Kaneko, deceased, late of Kobe, Japan (by Michio Kaneko, legal representative); Tsuyoshi Kobayashi, Mino, Japan; Yoshiaki Takebayashi; Shigeho Inaba, both of Takarazuka, Japan, and Hisao Yamamoto, Nishinomiya, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 369,621, June 13, 1973, abandoned. This application Feb. 19, 1976, Ser. No. 659,197

Int. Cl.² C07C *103/50*

U.S. Cl. 260—562 N 6 Claims

1. An anilide compound of the formula:



wherein R_1, R_2 and R_3 are each C_{1-3} alkyl; and n is 1 or 2, and the non-toxic salts thereof.

4,032,574
PRODUCTION OF POLYETHERPOLYOLS USEFUL IN PREPARING RIGID POLYURETHANE FOAMS

Akizo Keshi, Takatsuki; Katsuhisa Kodama, Nishinomiya; Ichiro Takemura, Takatsuki; Yoshihiko Tairaka, Sakai, and Kunio Yoshinaga, Ikeda, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Sept. 25, 1975, Ser. No. 616,898
Claims priority, application Japan, Oct. 7, 1974, 49-115799
Int. Cl.² C07C *93/04, 93/06, 93/08, 93/12*
U.S. Cl. 260—570 D 10 Claims

1. A method for producing a polyetherpolyol consisting essentially of reacting

A. compounds containing active hydrogen atoms, one third by weight to all of which is a reaction product obtained by reacting the distillation residue obtained in the distillation process of a crude organic diisocyanate produced by phosgenation of the corresponding organic diamine with

1. at least a member selected from the group consisting of water, aliphatic alcohols having 1 to 10 carbon atoms and alkanolamines having 1 to 6 carbon atoms and

2. a monoalkanolamine having 2 to 4 carbon atoms at a temperature ranging from 100° to 250° C with

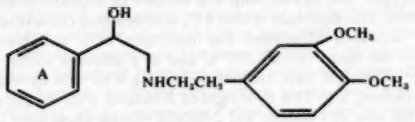
B. at least a member selected from the group consising of ethylene oxide and propylene oxide.

4,032,575
BENZYLALCOHOL AMINE DERIVATIVES

Muneyoshi Ikezaki, Ageo; Nobuo Ito, Tokyo; Yasushi Okazaki, Tokyo; Masao Hoshiyama, Tokyo; Taku Nagao, Ageo, and Hiromichi Nakajima, Yono, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Oct. 1, 1975, Ser. No. 618,355
Int. Cl.² C07C *91/22*
U.S. Cl. 260—570.6 3 Claims

1. A compound of the formula:



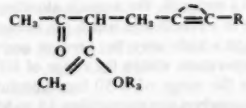
wherein Ring A is 4-hydroxyphenyl or a pharmaceutically acceptable acid addition salt thereof.

4,032,577
UNSATURATED KETONES

George Buchi, Cambridge, Mass., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 547,688, Feb. 6, 1975, Pat. No. 3,935,440, which is a division of Ser. No. 158,080, June 29, 1971, Pat. No. 3,884,970. This application Apr. 28, 1976, Ser. No. 680,949
Int. Cl.² C07C *49/24*
U.S. Cl. 260—594 3 Claims

1. A compound of the formula:

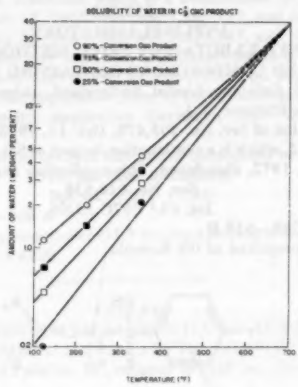


wherein R is hydrogen, lower alkenyl or lower alkyl; R_3 is lower alkyl, and the dotted bond can be optionally hydrogenated.

4,032,578
PROCESS FOR THE MANUFACTURE OF ALDEHYDES AND HDA AND OTHER ALCOHOLS BY ALDOL CONDENSATION

Charles G. Savini, Warren, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 547,475, Feb. 6, 1975, abandoned, which is a continuation of Ser. No. 317,615, Dec. 22, 1972, abandoned. This application Jan. 7, 1976, Ser. No. 647,150
Int. Cl.² C07C *47/02, 45/00, 29/14*
U.S. Cl. 260—601 R 8 Claims



1. An aldolization process which comprises contacting an aldehyde-containing feed with a catalyst, in an amount ranging from about 0.01 to about 3 weight percent based on the aldehyde-containing feed, selected from the group consisting of hydroxides, soaps, alkoxides and phenoxides of Groups I-A and II-A metals, quaternary ammonium hydroxides and choline in the presence of water in an amount substantially within the solubility limit of the aldehyde-containing feed at a temperature ranging from about 300° F. to about 1,000° F. to achieve a uniphase aldolization mixture.

7. A process for producing an aliphatic alcohol which comprises:

a. contacting an aldehyde-containing feed with a catalyst, in an amount ranging from about 0.01 to about 3 weight percent based on the aldehyde-containing feed, selected from the group consisting of hydroxides, soaps, alkoxides and phenoxides of Groups I-A and II-A metals, quaternary ammonium hydroxides and choline in the presence of water in an amount substantially within the solubility limit of the aldehyde-containing feed at a temperature ranging from about 300° F. to about 1000° F. to achieve a uniphase aldolization mixture; and, thereafter,

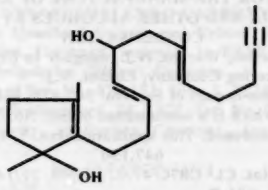
b. hydrogenating the aldol product produced in (a) above under conventional conditions and using conventional catalysts to produce said aliphatic alcohol.

4,032,579
11-SUBSTITUTED STEROIDS AND INTERMEDIATES

William S. Johnson, Portola Valley, Calif., assignor to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed Apr. 28, 1975, Ser. No. 572,379
Int. Cl.² C07C *35/06*
U.S. Cl. 260—617 R 1 Claim

1. A compound of the formula:

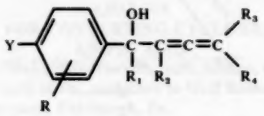


4,032,580
ANTI-INFLAMMATORY 1-PHENYL-2,3-BUTADIEN-1-OLS, METHODS OF USE AND COMPOSITIONS CONTAINING SAME

Eugene E. Galantay, Liestal, Switzerland, assignor to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 405,478, Oct. 11, 1973, Pat. No. 3,929,902, which is a continuation-in-part of Ser. No. 219,129, Jan. 19, 1972, abandoned. This application Sept. 18, 1975, Ser. No. 614,538
Int. Cl.² C07C *33/06*
U.S. Cl. 260—618 D 19 Claims

1. A compound of the formula



wherein

R is a hydrogen atom, or halo having an atomic weight of from about 19 to 80;

R_1 is a hydrogen atom or alkyl of 1 to 3 carbon atoms;

R_2 is a hydrogen atom or methyl; and

R_3 and R_4 are, independently, a hydrogen atom or alkyl of 1 to 3 carbon atoms, provided that at least one of R_3 and R_4 is a hydrogen atom when R_2 is methyl;

Y is bromo, iodo, isobutyl, tert. butyl, cyclohexyl, or cyclohexenyl.

18. The method of treating inflammation in an mammal which comprises administering to said mammal an inflammation relieving amount of a compound of claim 1.

19. A pharmaceutical composition useful for the treatment of inflammation in mammals comprising an inflammation relieving amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

4,032,581
METHOD FOR SEPARATION OF M- OR P-CRESOL

Akira Tasaka, Takatsuki; Hirokazu Hosaka, Hirakata, and Iwao Dohgane, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed July 3, 1975, Ser. No. 592,935
Claims priority, application Japan, July 12, 1974, 49-80662
Int. Cl.² C07C *39/06*, *37/22*
U.S. Cl. 260—621 B 22 Claims

1. A method for obtaining m- or p-cresol in a high purity from a mixture comprising m- and p-cresols having a composition outside the two compositions which give respectively the eutectic points inherent to the mixture, which comprises (1) applying a pressure of about 300 to about 10,000 atmospheres and a temperature of about 0° to about 100° C. to the mixture charged to a first pressure-zone, thereby separating said mixture into a crystal fraction containing either m- or p-cresol and a liquid fraction, whereby the elevated pressure causes the melting points of the m-cresol and p-cresol to be raised above that obtained under atmospheric pressure, (2) transferring said liquid fraction to a second pressure-zone kept under a lower pressure than that of the first pressure-zone, said lower pressure being sufficient to enable transfer of the liquid fraction from said first pressure-zone to said second pressure-zone, (3) liquefying the crystal fraction remaining in the first pressure-zone by raising the temperature and (4) discharging the liquefied crystal fraction out of the first pressure-zone.

4,032,582
METHOD OF OBTAINING PRIMARY ALCOHOLS WITH STRAIGHT CHAINS FROM C_4 HYDROCARBON CUTS

Emile Trebillon, Neuilly-sur-Seine, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed June 24, 1976, Ser. No. 699,339
Claims priority, application France, June 27, 1975, 75.20253
Int. Cl.² C07C *29/00*, *31/32*
U.S. Cl. 260—632 D 12 Claims

1. A method of preparing primary alcohols virtually all with a straight chain in which the molecular proportions are distributed on both sides of a medium centered at 8 to 16 carbon atoms, comprising the stages in sequence of preparing tri-n-butylaluminum, fixing ethylene on the butylaluminum to an average chain length of C_8 to C_{16}, oxidizing with a gas containing oxygen, and hydrolyzing in a mixture of aliphatic primary alcohols, characterized in that a C_4 hydrocarbon cut is reacted with activated aluminum and hydrogen at a temperature within the range of 80°–220° C and at a pressure within the range of 20–250 bars, the cut containing 0 to 95% by weight of 1-butene, 0 to 75% by weight of 2-butene, with the proviso that the sum of 1-butene and 2-butene represents at least 15% by weight, 4 to 75% by weight of isobutene and 0 to 66% by weight of butene and isobutene, thus giving a mixed organic aluminum compound essentially comprising a mixture of butylaluminums:

normal	al - CH_2—CH_2—CH_3
iso	al - CH_2—CH(—CH_3)—CH_3
with or without secondary	al - CH(—CH_3)—CH_2—CH_3

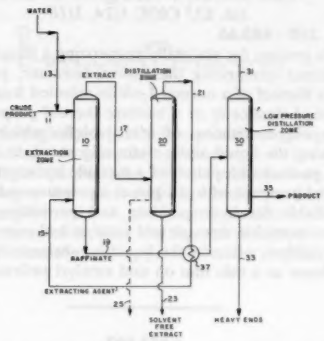
wherin al represents one-third gram-atom of aluminum in the combined state, the dibutylaluminum monohydride concentration present in the organic aluminum compound of the reaction medium being adjusted during this operation to between 20 and 80 **l molar %, the organic aluminum compound is then submitted to a reaction in which the isobutyl and secondary butyl groups which may be present are displaced by reaction at a temperature within the range of** 80°–180° C and a pressure within the range of 1–50 bars absolute by the butene in a C_4 hydrocarbon cut comprising 15 to 95% by weight of 1-butene, 0 to 75% by weight of 2-butene, 4 to 70% by weight of isobutene and 0 to 66% by weight of butane and isobutane, in at least two reaction zones arranged in series and

fed in counter-current flow with the said mixture of butylaluminum isomers on the one hand and with the C_4 hydrocarbon cut, on the other hand.

4,032,583
PURIFICATION OF 1,4-BUTANEDIOL

Robert P. Arganbright, Seabrook, and William G. Bowman, Pasadena, both of Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Aug. 8, 1975, Ser. No. 602,986
Int. Cl.² C07C *29/24*
U.S. Cl. 260—637 R **9 Claims**



1. In a process for recovering 1,4-butanediol in high purity from a mixture comprising 1,4-butanediol in admixture with minor amounts of one impurties selected from the group of dibutyl succinate, dibutyl fumarate, dibutyl maleate, γ-hydroxybutyraldehyde, dibutyl butoxy succinate and γ-butyrolactone, the improvement which comprises

a. adding water to said mixture in an amount to produce an aqueous 1,4-butanediol-containing mixture having from about 5 to about 75 weight percent water,

b. intimately contacting said aqueous 1,4-butanediol-containing mixture in an extraction zone with a hydrocarbon extracting agent selected from the group of alkanes of from 6 to about 10 carbon atoms, aromatic hydrocarbons of from 6 to about 10 carbon atoms, and mixtures thereof, in an amount such that the volumetric ratio of the aqueous 1,4-butanediol-containing mixture to the hydrocarbon extracting agent is from about 5:1 to about 1:5,

c. allowing the contacted aqueous 1,4-butanediol-containing mixture and the hydrocarbon extracting agent to separate whereby there is formed an extract phase containing the bulk of said impurities and an aqueous 1,4-butanediol-containing raffinate of reduced impurity content,

d. recovering said extract phase from said extraction zone,

e. recovering said raffinate from said extraction zone,

f. introducing said raffinate into a distillation zone operated at reduced pressure and recovering substantially pure 1,4-butanediol from a lower portion of the distillation zone.

4,032,584
STABILIZED METHYLENE CHLORIDE

Mazin R. Irani, Tarrytown, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 3, 1976, Ser. No. 682,284
Int. Cl.² C07C *17/42*
U.S. Cl. 260—652.5 R **3 Claims**

1. A stabilized methylene chloride composition consisting essentially of methylene chloride and mixed amylenes in amounts varying from about 0.01% to about 2.5% by weight, propylene oxide in amounts varying from about 0.01% to about 2% by weight, butylene oxide in amounts varying from about 0.1% to about 0.75% by weight, and tertiary butylamine in amounts varying from about 1 ppm to about 0.01% by weight, of the methylene chloride.

4,032,585
1-ETHYL-CYCLOOCTADIENE-1,5

Günther Wilke, and Paul Heimbach, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Continuation of Ser. No. 463,087, April 22, 1974, Pat. No. 3,929,921, which is a division of Ser. No. 109,949, Jan. 26, 1971, Pat. No. 3,849,506, which is a continuation of Ser. No. 843,220, July 18, 1969, Pat. No. 3,586,727, and Ser. No. 845,901, July 29, 1969, Pat. No. 3,629,347, and Ser. No. 845,904, July 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 582,775, Sept. 27, 1966, abandoned. This application June 9, 1975, Ser. No. 585,287
Claims priority, application Germany, Sept. 29, 1965, 1493221
The portion of the term of this patent subsequent to Nov. 19, 1991, has been disclaimed.
Int. Cl.² C07C *13/26*
U.S. Cl. 260—666 A **1 Claim**

1. 1-ethyl-cyclooctadiene-1,5 having a boiling $point_{16}$ of 76° C and n_D^{20} of 1.4900.

4,032,586
DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 663,417, March 3, 1976, which is a division of Ser. No. 475,691, June 3, 1974, Pat. No. 3,960,709, which is a continuation-in-part of Ser. No. 391,428, Aug. 24, 1973, abandoned, which is a division of Ser. No. 225,634, Feb. 11, 1972, Pat. No. 3,775,301, which is a division of Ser. No. 839,086, July 3, 1969, abandoned. This application July 6, 1976, Ser. No. 702,830
Int. Cl.² C07C *15/02*
U.S. Cl. 260—673 **21 Claims**

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 5 wt. % germanium and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium and germanium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and rhodium are present in the elemental metallic state; and wherein substantially all of the germanium is present in an oxidation state above that of the elemental metal.

4,032,587
DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 574,222, May 5, 1973, Pat. No. 3,959,121. This application Apr. 26, 1976, Ser. No. 680,268
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Int. Cl.² C07C *5/22*
U.S. Cl. 260—673.5 **27 Claims**

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group

metal, about 0.05 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % indium and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt and indium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the indium is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrocyclization conditions or in a mixture of these states.

4,032,588

PROCESS FOR PREPARING 2,6,10,15,19,23-HEXAMETHYLTETRACOSANE

Kenichi Tomita, Yokohama; Toshiaki Shibuya; Suzuko Koshiba, both of Tokyo, and Kazuo Itoi, Kurashiki, all of Japan, assignors to Shiseido Co., Ltd., Japan

Filed Feb. 4, 1975, Ser. No. 546,990

Claims priority, application Japan, Feb. 24, 1974, 49-16316

Int. Cl.² C07C *9/00, 11/00*

U.S. Cl. 260—676 R **2 Claims**

1. A process for preparing 2, 6, 10, 15, 19, 23-hexamethyltetralosane, comprising the steps of:

a. preparing diacetylene dialcohol (i) by reacting at least one ketone selected from the group consisting of 6, 10-dimethylundecan-2-one, 6, 10-dimethylundeca-3, 9-dien-2-one, 6, 10-dimethylundeca-5, 9-dien-2-one, 6, 10-dimethylundeca-5, 10-dien-2-one and 6, 10-dimethylundeca-3, 5, 9-trien-2-one with acetylene in liquid amonia in the presence of metallic sodium under reflux of liquid ammonia condition and then subjecting the reaction product to the oxidative coupling in the presence of cuprous chloride at room temperature while blowing oxygen thereinto or (ii) by reacting said ketone with diacetylene in liquid ammonia in the presence of at least one metal selected from the group consisting of metallic sodium and metallic lithium under reflux of liquid ammonia condition;

b. hydrocracking the diacetylene with hydrogen in the presence of a nickel catalyst.

4,032,589

DEHYDROGENATION CATALYST AND PROCESS

Robert G. Wall, Pinole, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 17, 1975, Ser. No. 559,288

Int. Cl.² C07C *5/18*

U.S. Cl. 260—683.3 **6 Claims**

1. A process for dehydrogenating a C_2 to C_{20} alkane or mixtures thereof which comprises contacting the alkane with a catalyst comprising 0.1 to 1 weight percent platinum, 0.1 to 1 weight percent chromium, and 0.1 to 1 weight percent lithium and an alumina support, wherein the dehydrogenation is carried out under conditions including a temperature between 850° and 1250° F, a liquid hourly space velocity between 1 and 40, and a hydrogen to alkane molar ratio between 0.5 and 20.

4,032,590

OLIGOMERIZATION OF ETHYLENE

David Robert Burnham, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 18, 1975, Ser. No. 605,506

Claims priority, application United Kingdom, Aug. 29, 1974, 37774/74

Int. Cl.² C07C *3/10*

U.S. Cl. 260—683.15 D **12 Claims**

1. A process for the oligomerisation of ethylene in which the ethylene is contacted with a catalyst which is the reaction product of a weak field ligand complex of a metal of Group VIII of the Periodic Table and an inorganic oxide support material which contain other elements to impart sufficient Bronsted acidity to said support to displace at least one of the ligands attached to the said Group VIII metal, in the presence of a hydrocarbyl of a metal of Groups I to III of the Periodic Table.

4,032,591

PREPARATION OF ALPHA-OLEFIN OLIGOMER SYNTHETIC LUBRICANT

Barrett L. Cupples, Franklin Township, Allegheny County, and William J. Heilman, Allison Park, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 24, 1975, Ser. No. 634,624

Int. Cl.² C07C *5/24, 5/18*

U.S. Cl. 260—683.65 **6 Claims**

1. The process for skeletally isomerizing a liquid alpha-olefin oligomer comprising the trimer, tetramer, pentamer or mixtures thereof of a normal 1-olefin selected from 1-octene, 1-decene, 1-dodecene or a mixture thereof prepared by the cationic oligomerization of said 1-olefin which comprises introducing the liquid alpha-olefin oligomer into the top of a column packed with pellets of a metallic hydrogenation catalyst in the presence of hydrogen at a pressure and a temperature suitable for hydrogenation and permitting the liquid oligomer to trickle through said catalyst bed over the surface of said catalyst, whereby the liquid is substantially present in said column as a thin film on said catalyst pellets.

4,032,592

METHOD FOR THE PREPARATION OF A MODIFIED CRYSTALLINE PROPYLENE POLYMER

Sadahide Ogihara, Fujisawa; Yoichi Nakamura, Yono, and Osamu Fukui, Toyonaka, all of Japan, assignors to UBE Industries, Ltd., Ube, Japan

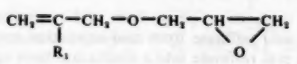
Filed Feb. 27, 1975, Ser. No. 553,439

Claims priority, application Japan, Mar. 15, 1974, 49-29193

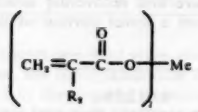
Int. Cl.² C08F *255/04*

U.S. Cl. 260—827 **24 Claims**

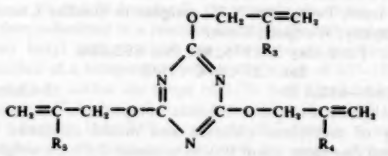
1. A method for the preparation of modified propylene polymers usable as bonding material, from a crystalline propylene polymer consisting of random and block copolymers of 2 to 15% by weight of ethylene and a balance of propylene and mixtures of 80% by weight or more of the above-mentioned copolymer and a balance of a high density polyethylene, comprising the steps of: uniformly admixing said crystalline propylene polymer with a modifying composition consisting of at least one organic peroxide, and a modifying agent consisting of γ-methacryloyloxypropyl trimethoxysilane and at least one ethylenically unsaturated organic compound selected from the group consisting of the formulae (I) through (V):



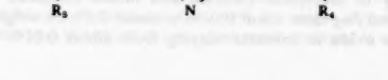
(I),



(II),



(III),



(IV),

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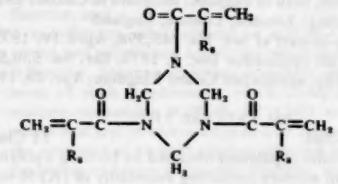
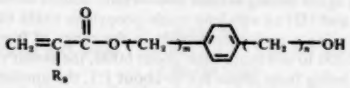


or



(V)

wherein R_1 through R_9 respectively represent a hydrogen atom or methyl radical, Me represents a metal atom in Groups I, II, III and VIII in the Periodic Table, *l* represents an integer corresponding to the valence of the metal atom Me, and *m* and *n* each represent 0 or 1, and heating the above admixture at a temperature lower than the thermal decomposing point but not lower than the melting point of said crystalline propylene polymer.

4,032,593
CURABLE RESIN COMPOSITIONS

Hiroshi Samejima, Ibaragi, Japan, assignor to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

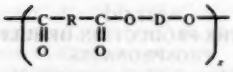
Filed July 11, 1975, Ser. No. 595,304

Claims priority, application Japan, July 12, 1974, 49-79862; May 6, 1975, 50-53156

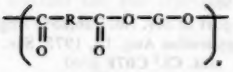
Int. Cl.² C08L *63/00*

U.S. Cl. 260—835 **9 Claims**

1. A curable epoxy resin composition comprising
   a. a polyepoxide compound containing at least two 1,2-epoxy groups per molecule,
   b. 1 to 10% by weight, based on the polyepoxide compound (A) of an aromatic copolyester having a weight average molecular weight of 10,000 to 100,000 and composed of recurring units of formula (I) and recurring units of formula (II)



(I)



(II)

wherein R is a residue resulting from the removal of carboxyl groups from an aromatic dicarboxylic acid; D is a residue resulting from the removal of hydroxyl groups from a glycol containing 2 to 15 carbon atoms; G is a residue resulting from the removal of the terminal hydroxyl group from a long-chain poly(alkylene oxide) glycol having a number average molecular weight of 350 to 6,000; and $x/x + y$ is from 0.2 to 0.8,

   c. a curing agent for the polyepoxide compound (A).

4,032,594
POLYMERIC STABILIZERS FOR POLYVINYL CHLORIDE RESIN

Joseph Serratore, and William L. Clayton, both of Sarnia, Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed June 10, 1975, Ser. No. 585,485

Int. Cl.² C08G *49/04*

U.S. Cl. 260—837 PV **6 Claims**

1. A polyvinyl chloride composition comprising
   a. about 1 to 50 parts per 100 parts of polyvinyl chloride resin of a graft terpolymer of ethylene, propylene and an unsaturated epoxy monomer selected from the group consisting of glycidyl methacrylate, glycidyl acrylate, allyl glycidyl ether, vinyl glycidyl phthalate and allyl glycidyl phthalate and wherein the unsaturated epoxy monomer is grafted onto an ethylene/propylene polymer backbone; and
   b. a polyvinyl chloride resin, wherein said composition has improved thermal stability and a glass transition temperature equal to or greater than the glass transition temperature of the polyvinyl chloride resin.

4,032,595
ANTISTATIC AGENTS

Ian Stuart Fisher, and James Eric McIntyre, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England

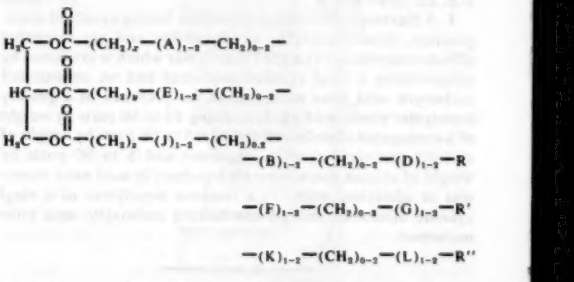
Division of Ser. No. 428,314, Dec. 26, 1973, abandoned. This application Aug. 5, 1975, Ser. No. 601,978

Claims priority, application United Kingdom, Jan. 12, 1973, 1733/73

Int. Cl.² C08K *5/11*

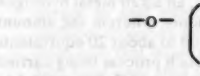
U.S. Cl. 260—857 PE **12 Claims**

1. A synthetic polymer mixture containing a minor proportion of at least one reaction product of (a) a compound of the formula:



wherein *x*, *y* and *z* are integers of from 1 to 22; R,R′ and R″ are C_nH_{2n+1}, where *n* is an integer from 1 to 23; A, B, D, E, F, G, J, K and L are selected from

and —(CH=CH)—
where M is selected from



and H, where P and Q are selected from methyl and H, and *v* is an integer greater than 0; provided that at least one of A, B,

D, E, F, G, J, K and L is other than —(CH=CH)—, at least one M is other than hydrogen, and the sum of v is equal to a value between 10 and 500, with (b) an ester of oxalic acid or of malonic acid, the molecular ratio of (b) to (a) being at least 2:1.

4,032,596

CURE ACCELERATORS FOR PEROXYKETAL INITATED POLYESTER RESINS

Melville W. Uffner, Glen Mills, and Burton D. Beitchman, Springfield, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 20, 1976, Ser. No. 734,295
Int. Cl.² C08L *67/06*
U.S. Cl. 260—862 **17 Claims**

1. A curable polyester mixture comprising:
a. an unsaturated polyester of a dihydric alcohol and an alpha-beta ethylenically unsaturated dicarboxylic acid,
b. ethylenically unsaturated copolymerizable monomer,
c. free radical initiating diperoxyketal, and
d. an organic quaternary ammonium chloride in amount effective to accelerate free radical initiation of said diperoxyketal, said quaternary compound being soluble in the mixture.

4,032,597

THERMOPLASTIC RESIN COMPOSITION

Tanoshi Yamagoshi, Niihama; Minoru Terakawa, Saijyo; Aiiti Shirahata, Niihama; Sadao Sekiguchi, Niihama; Saburo Mishiba, Niihama; Takeshi Shimamura, Niihama, and Shigeru Tajima, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 319,233, Dec. 29, 1972, abandoned. This application Mar. 25, 1975, Ser. No. 561,986
Claims priority, application Japan, Dec. 29, 1971, 47-3102
Int. Cl.² C08L *9/02, 51/08*
U.S. Cl. 260—876 R **14 Claims**

1. A thermoplastic resin composition having excellent transparency, impact strength, weatherability and gas screening effects comprising (1) a graft copolymer which is produced by polymerizing a vinyl cyanide monomer and an unsaturated carboxylic acid ester monomer in the presence of a gummy copolymer produced by polymerizing 10 to 60 parts by weight of a conjugated diolefinic monomer, 5 to 60 parts by weight of at least one vinyl cyanide monomer and 5 to 90 parts by weight of at least one unsaturated carboxylic acid ester monomer in admixture with (2) a resinous copolymer of a vinyl cyanide monomer and an unsaturated carboxylic acid ester monomer.

4,032,598

PROCESS FOR PURIFYING HALOGENATED ALKENYLPHENOL POLYMERS

Hiroshi Fujiwara; Asao Takahashi, both of Soka, and Ken Suzuki, Saitama, all of Japan, assignors to Maruzen Oil Co. Ltd., Osaka, Japan

Filed Apr. 26, 1976, Ser. No. 680,628
Int. Cl.² C08L *23/00, 9/00;* **C08F** *6/00;* **C08J** *3/00*
U.S. Cl. 260—878 R **19 Claims**

1. A process of purifying a halogenated alkenylphenol polymer which comprises treating the halogenated alkenylphenol polymer with an aqueous solution of at least one basic compound selected from the group consisting of an alkali metal hydroxide, an alkali metal carbonate, an alkali metal hydrogen carbonate, an alkylamine and ammonia, wherein the amount of said basic compound is about 1/100 to about 20 equivalents per phenol nucleus in the polymer, such process being carried out at a temperature no lower than about 0° C. for about 1 to about 5 hours to thereby dissolve the polymer in the aqueous solution of the basic compound.

4,032,599

HYDROPHILIC COPOLYMERS

Philip William Cordrey, London, and Wiktor Mikucki, Thames Ditton, both of England, assignors to Contact Lenses (Manufacturing) Limited, London, England

Continuation-in-part of Ser. No. 245,398, April 19, 1972, abandoned. This application Dec. 9, 1974, Ser. No. 530,570
Claims priority, application United Kingdom, Apr. 20, 1971, 10186/71
Int. Cl.² C08L *33/12*
U.S. Cl. 260—885 **11 Claims**

1. A hydrophilic copolymer obtained by forming a polymerization reaction mixture consisting essentially of (A) N-vinyl-2-pyrrolidone, (B) methyl methacrylate, (C) at least one cross-linking agent having at least two olefinic double bonds in its molecule and (D) an ethylene oxide-propylene oxide block copolymer having a molecular weight in the range of from at least about 1000 to not more than about 6000, the molar ratio of (A) : (B) being from about 6:1 to about 1:1, the amount of (C) being from about 0.2 to about 5% by weight based on the weight of (A) plus (B), and the amount of (D) being from about 0.25% to not more than 10% by weight based on the sum of the weights of (A) plus (B) plus (C), polymerizing said polymerization reaction mixture at a temperature of from 35° to 50° C until the monomers have gelled and then raising the temperature to 50° to 60° C and completing the polymerization at the latter temperature and thereby obtaining the hydrophilic copolymer.

4,032,600

RESIN FORMULATION FOR ROTATIONAL MOLDING AND SHAPED STRUCTURES

John L. MacAdams, Schaumburg, Ill.; William C. L. Wu, Pittsford, N.Y., and Richard S. Joyner, DesPlaines, Ill., assignors to Chemplex Company, Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 506,271, Sept. 16, 1974, abandoned, which is a division of Ser. No. 327,577, Jan. 29, 1973, abandoned. This application Mar. 24, 1976, Ser. No. 670,082
Int. Cl.² C08L *23/08*
U.S. Cl. 260—897 B **10 Claims**

1. A blend of polymers especially suitable for the rotational molding of shaped structures, comprising: a three component blend of (1) 60–80 wt.% of a member of a first class consisting of high density polyethylene and high density ethylene-alkene copolymers containing 4 or 6 carbon atoms in the alkene group with (2) 5–20 wt.% of a member of a second class consisting of ethylene-propylene essentially random copolymer and an essentially random terpolymer of ethylenepropylene monomer in which the monomer is selected from the group consisting of 1,4-hexadiene, 5-ethylidine-2-norbornene and 5-methylene-2-norbornene, and (3) 5–30 wt.% of a copolymer of ethylene-vinyl acetate for a total of 100%.

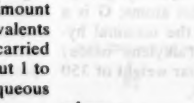
4,032,601

PROCESS FOR THE PRODUCTION OF SULFONAMIDE PHOSPHONATES

Gail H. Birum, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 386,255, Aug. 6, 1973, abandoned. This application Aug. 18, 1975, Ser. No. 605,694
Int. Cl.² C07F *9/40*
U.S. Cl. 260—969 **3 Claims**

1. Process for the production of:



where

R′ is aryl, aryloxy or chloroalkyloxy of 2 to 10 carbon atoms,

R″ is alkyl, aryl, haloaryl, or alkaryl of 1 to 15 carbon atoms, where the aryl halogen is bromine, chlorine or fluorine, and

R‴ is hydrogen, alkyl, alkenyl or aryl of 1 to 15 carbon atoms and substituted aryl forms wherein the substituent is fluorine, bromine, chlorine, hydroxyl, alkyloxy or mixtures of such substituents, which comprises heating a mixture containing $R_2'POR$, $R'''CHO$ and H_2NSO_2R'' where R is aryl or chloroalkyl of 2 to 10 carbon atoms, in the presence of an acid catalyst selected from the group consisting of boron trifluoride etherate, acetic acid, propionic acid, butyric acid and benzoic acid.

4,032,602

PROCESS FOR THE PRODUCTION OF PHOSPHITE CHLORIDES

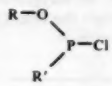
Zdenek Mazour, Frenkendorf, and Heimo Brunetti, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,779

Int. Cl.² C07F 9/20

U.S. Cl. 260—972 **10 Claims**

1. A process for the production of phosphite chlorides of the formula I

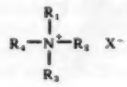


(I)

wherein

R represents C_1–C_{18} alkyl, phenyl or phenyl mono-, di- or tri-substituted by C_1–C_{18} alkyl, C_1–C_{18} alkoxy or halogen with the total number of carbon atoms for more than one alkyl or alkoxy group not being greater than 18, and

R′ represents OR or chlorine, wherein R has the definition given above which comprises reacting phosphorus trichloride with a symmetrical trialkyl- or tri(substituted) phenyl phosphite that is present in the amount necessary for the formation of the phosphite chlorides of formula I at a temperature of between 15° C and 75° C and in the presence of a hydrous quaternary compound of nitrogen or of phosphorus, respectively, of the formula II



(II)

wherein

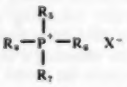
R_1 represents C_1 –C_{18} -alkyl, C_7–C_9-phenylalkyl or C_6–C_{10}-aryl,

R_2 represents C_1–C_3-alkyl or C_7–C_9-phenylalkyl,

R_3 represents C_1–C_{12}-alkyl or C_7–C_9-phenylalkyl,

R_4 represents C_1–C_4-alkyl, and

X represents chlorine or bromine, whereby the radicals R_1 and R_2 together can also represent a pentamethylene group and of the formula III



(III)

wherein

R_5 represents C_1–C_{18} alkyl or phenyl,

R_6, R_7 and R_8 each independently represent C_1–C_8 alkyl or phenyl, and

X represents chlorine or bromine.

4,032,603

PRODUCTION OF PHOSPHORUS OXY COMPOUNDS

Johannes Kaschuba, Odenthal-Gloebusch, and Manfred Ernst, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 23, 1976, Ser. No. 651,985

Claims priority, application Germany, Feb. 22, 1975, 2507730

Int. Cl.² C07F 9/11, 9/32, 9/40, 9/53

U.S. Cl. 260—990 **6 Claims**

1. A process for the purification of a phosphorus oxy compound selected from the group consisting of phosphoric, phosphonic and phosphinic acid esters and phosphine oxides containing impurities comprising phosphorus compounds of an intermediate valency stage, comprising mixing the impure phosphorus oxy compounds with an oxidizing agent, subsequently reacting the mixture with at least one of water and an alcohol, and separating the purified phosphorus oxy compound.

4,032,604

HOT WATER SUPPLY AND DISTRIBUTION STRUCTURE FOR COOLING TOWERS

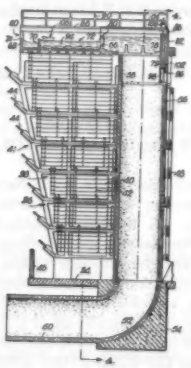
Graham Charles Parkinson, London, England, and Homer E. Fordyce, Kansas City, Mo., assignors to The Marley Cooling Tower Company, Mission, Kans.

Continuation-in-part of Ser. No. 286,341, Sept. 5, 1972, Pat. No. 3,880,964. This application Apr. 17, 1975, Ser. No. 568,891

The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.

Int. Cl.² B01F 3/04

U.S. Cl. 261—111 **9 Claims**



1. In combination with a crossflow cooling tower provided with a fill assembly having respective air inlet and outlet faces with inner and outer fill portions therebetween for serial passage of air therethrough, hot liquid supply and distribution structure comprising:

horizontally adjacent, inner and outer hot liquid distribution basins respectively overlying said inner and outer fill portions for receiving and distributing hot liquid to be cooled to respective portions;

first liquid supply means located inwardly of said inner distribution basin and adjacent thereto;

means for supplying hot liquid from said first liquid supply means to said adjacent inner distribution basin which includes structure permitting said hot liquid to overflow from said first liquid supply means to said inner distribution basin only after the liquid level within said first liquid supply means reaches a predetermined level; and

second liquid supply means extending between and inter-

communicating said first liquid supply means and outer distribution basin for delivery of hot liquid to the latter, said second liquid supply means being in communication with said first liquid supply means at a level therein below said predetermined level.

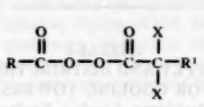
4,032,605

ALPHA-HALO SUBSTITUTED DIACYL PEROXIDES

Donald W. Wood, Concord, Calif., assignor to Argus Chemical Corporation, Brooklyn, N.Y.

Continuation-in-part of Ser. No. 675,360, Oct. 16, 1967, Pat. No. 3,652,681. This application Dec. 6, 1971, Ser. No. 205,387
Int. Cl.² C07C 179/14
U.S. Cl. 260—610 D 12 Claims

1. An asymmetrical diacyl peroxide of from six to 20 carbon atoms of the formula:



wherein

X is hydrogen, chlorine or bromine, at least one X being chlorine or bromine;

R^1 is saturated aliphatic hydrocarbon of from two to 10 carbon atoms, having from zero to five branches along the chain; and

R is a saturated aliphatic or aromatic organic radical of from one to eleven carbon atoms and from zero to three heteroatoms and composed solely of carbon, hydrogen, oxygen as oxy and halogen of atomic number nine to 35, with the proviso that R has at least one atom of oxygen or halogen, when R^1 is straight chain.

4,032,606

METHOD FOR PRODUCING SOLID-POROUS RUBBER ARTICLES

Anatoly Vasilievich Solomatin, ulitsa Novatorov, 40, korpus 4, kv. 140, Moscow; Anatoly Grigorievich Evseev, smena, NIIRP, 4, kv. 66, Moskovskoi oblasti Zagorsk; Ardalion Nikolaevich Ponomarev, p/o Chernogolovka, ulitsa Tretya, 2, kv. 3; Viktor Semenovich Oskin, p/o Chernogolovka, ulitsa Pervaya, 1, kv. 6, both of Moskovskaya oblast, Noginsky raion, and Viktor Lvovich Talroze, Vorobievskoe shosse, 11, kv. 21, Moscow, all of U.S.S.R.

Filed Sept. 17, 1974, Ser. No. 506,797
Int. Cl.² B29D 27/00; C08C 19/00
U.S. Cl. 264—22 2 Claims

1. A process for the production of a composite cellular elastomeric article of unitary structure having preselected solid portions and selected cellular portions which comprises the steps of:

a. forming into a blank, an elastomeric composition having a chemical blowing agent incorporated therein;

b. irradiating said blank in said preselected portions from a source of cross-linking ionizing radiation, so that cross-linking is effected thereby in said preselected portions by varying the penetrating capacity, intensity and character of said ionizing radiation to said preselected portions;

c. heating said entire blank including both said radiated preselected portions and the un-radiated selected portions to temperatures above that which said blowing agent decomposes, to thereby foam said blank, in said selected portions while maintaining said cross-linked irradiated portions in substantially solid or no-cellular form.

4,032,607

PROCESS FOR PRODUCING SELF-BONDED WEBS OF NON-WOVEN CARBON FIBERS

David Arthur Schulz, Fairview Park, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Sept. 27, 1974, Ser. No. 510,128
Int. Cl.² B29C 6/00, 25/00; D01F 9/12
U.S. Cl. 264—29.3 19 Claims

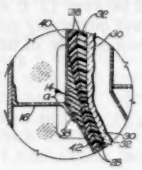
1. A process for producing self-bonded webs of non-woven carbon fibers which comprises spinning carbonaceous pitch fiber from a nonthixotropic carbonaceous pitch having a mesophase content of from 40 percent by weight to 90 percent by weight, which mesophase content, under quiescent conditions, forms homogenous bulk mesophase having large coalesced domains; disposing staple lengths of the spun fiber in intimately contacting relationship with each other in a non-woven fibrous web; heating the web produced in this manner in an oxidizing atmosphere for a time sufficient to thermoset the surfaces of the fibers of the web to an extent which will allow the fibers to maintain their shape upon heating to more elevated temperatures but insufficient to thermoset the interior portions of the fibers; heating the web containing the externally thermoset fibers under compressive pressure in an oxygen-free atmosphere to a temperature sufficiently elevated to cause the mesophase pitch in the unoxidized interior portions of the fibers to undergo liquid flow and exude through the surfaces of the fibers and contact the surfaces of the adjacent fibers; and further heating the web to a carbonizing temperature in an oxygen-free atmosphere to produce a carbon body wherein the fibers are bonded to each other by infusible carbon bonds.

4,032,608

CRYOGENIC LIQUID CONTAINMENT METHOD

Theodore C. Zinniger, Livermore, and Phillip J. Burke, San Jose, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Division of Ser. No. 487,959, July 12, 1974, Pat. No. 3,927,788. This application Aug. 22, 1975, Ser. No. 607,086
Int. Cl.² B29D 27/00
U.S. Cl. 264—46.6 5 Claims

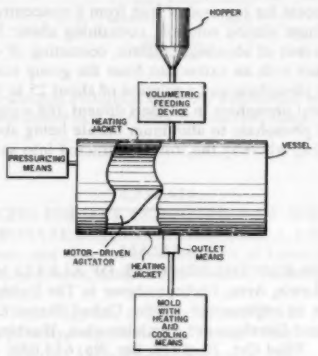


1. A method of insulating the corner section of a cryogenic liquid containment structure comprising the steps of packing a selected amount of a given filler material against a pair of converging walls in the area of the intersection of the walls of the said structure, thereafter progressively spraying selected portions of the surfaces of the converging walls adjacent their point of intersection as well as the previously packed filler material with an insulating cryogenic thermosetting polyurethane foam materials of a selected density and cell formation to produce at least one rigid insulating layer of the foam material and while spraying said foam material in place and allowing it to be cured in situ effecting a smaller build up and less thickness of the foam material in the area of the previously packed filler material and wall surface convergence than on the wall surfaces adjacent thereto with the thinner section of the foam material insulating layer having a thickness that can be as much as one-third less than that of the thickest section of the said foam material insulating layer while providing a load transfering hinge in the said layer.

4,032,609
METHOD FOR PRE-EXPANDING AND MOLDING EXPANDABLE THERMOPLASTIC POLYMER PARTICLES

Stuart B. Smith, Chelmsford, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.

Continuation-in-part of Ser. No. 288,230, Sept. 11, 1972. This application July 22, 1975, Ser. No. 598,509
Int. Cl.² B29D 27/00
U.S. Cl. 264—53 9 Claims



1. A method of mold expandable thermoplastic polymer particles containing a blowing agent comprising:

a. inserting a measured amount of the particles into a vessel;

b. heating the particles in a substantially dry atmosphere within said vessel to a temperature high enough to soften the polymer particles and volatize the blowing agent, the heat applied by conduction through the walls of the vessel and radiation therefrom and causing partial expansion of the particles;

c. agitating the particles within said vessel at all times during the heating thereof in a manner so that the particles are repeatedly wiped by an agitator within said vessel against the walls thereof and then returned toward the center of said vessel;

d. subjecting the particles while in their heat softened state to a super atmospheric pressure with a substantially dry gaseous medium after a predetermined period of heating in said vessel the pressure being adequate to substantially prevent further expansion of the particles to obtain the desired generally uniform density thereof;

e. removing the particles from said vessel with the aid of the gaseous medium under pressure which carries said particles out of the closed vessel when an exit opening is provided for the particles.

f. conveying the heated partially expanded particles to a mold and filling the mold therewith and;

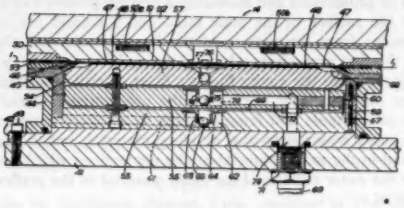
g. heating the particles in the mold to effect the further expansion and fusion of the particles into the desired molded article;

The temperature of the particles being continuously maintained above the boiling-point of the blowing agent within said particles at all time subsequent to the partial expansion of the particles in said vessel up to the final expansion and fusion of the particles within the mold.

4,032,610
MANUFACTURE OF CONTOURED RECORDS

Basil Harry Royston Spiller, and Alan Phillipson, both of London, England, assignors to Decca Limited, London, England

Continuation of Ser. No. 520,166, Nov. 1, 1974, which is a division of Ser. No. 331,203, Feb. 9, 1973, Pat. No. 3,860,382.
This application Mar. 26, 1976, Ser. No. 670,842
Claims priority, appiication United Kingdom, Feb. 23, 1972, 8427/72; Oct. 17, 1972, 47703/72
Int. Cl.² B29D 17/00
U.S. Cl. 264—107 6 Claims



1. A method of making contoured records comprising the steps of:

disposing a sheet of thin thermoplastics material between a support and one side of a thin, flexible, heat conductive, contoured matrix;

heating the region of the sheet adjacent the matrix uniformly by distributing relatively hot hydraulic fluid under pressure evenly to the periphery of a narrow circular pressure chamber of which one broad wall is cnstituted by a thin, flexible, heat conductive diaphragm disposed adjacent the other side of the matrix, and providing a radial even flow of the fluid towards an outlet provided in the center of the chamber;

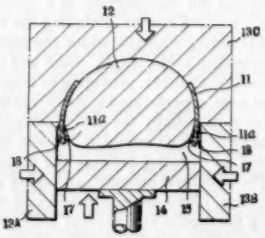
impressing the contours of the matrix on said sheet by increasing the pressure of said even radial flow of fluid through the chamber whereby said region of the sheet is pressed against the support; and

cooling the impressed region of the sheet by providing a radial even flow of relatively cold hydraulic fluid through the chamber from the periphery to the central outlet thereof.

4,032,611
METHOD OF MANUFACTURING A FOOTWEAR

Tatsuo Fukuoka, No. 3, 3-Ban, 2-Chome, Shin-Minami-Fukushima, Tokushima, Japan

Filed July 28, 1975, Ser. No. 599,325
Claims priority, application Japan, Apr. 30, 1974, 50-53034
Int. Cl.² B29F 1/00; B29C 6/04
U.S. Cl. 264—244 2 Claims



1. In a method for manufacturing a footwear comprising the steps of placing in a mold assembly having male and female molds a preformed section of appropriate material forming a

part of the footwear in such a manner that a portion of the preformed section is within a molding cavity for molding another section of the footwear, injecting molding material into the cavity to thereby integrally connect the preformed section with the molding material, the improvement comprising supporting a peripheral portion of the preformed material away from the molding surfaces of the male and female molds by a plurality of pairs of projections which extend outwardly from the surfaces of the male and female molds to provide a space between the peripheral portion of the preformed material and the molding surface of each of the male and female molds, each pair of projections being spaced from the other pairs of projections and including a first projection extending from the surface of the male mold and a second projection extending from the surface of the female mold and aligned with the first projection, whereby the molding material which is injected into the cavity forms a layer of mold material between the peripheral portion of the preformed material and each of the male and female molds to securely connect the preformed material to the molding material, and holes are formed in the mold material by the projections which extend from the outer surface of the mold material to the preformed material.

4,032,612

METHOD AND A DEVICE FOR PRODUCING A PLATE-LIKE STRUCTURAL ELEMENT

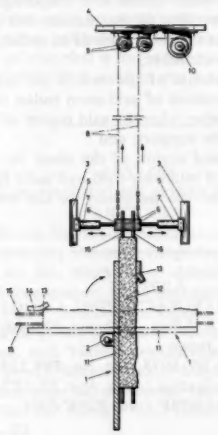
Hendrik Krekel, Dillenburgstraat 93, Breda, Netherlands

Filed May 20, 1974, Ser. No. 471,298

Claims priority, application Netherlands, May 21, 1973, 7307077

Int. Cl.² B28B *13/05*

U.S. Cl. 264—259 **5 Claims**



1. A method for the manufacture of a plate-like structural element from a cement mortar, including the steps of providing a flat mould having a length, width and thickness approximately corresponding to the length, width and thickness of the plate-like structural element, providing at least one reinforcement of metal rods, a perforated plate or synthetic resin rods extending over substantially the entire surface of the mould and projecting beyond said mould at one side thereof, said one side comprising an opening defining the ultimate width and thickness of the structural element, arranging said mould in a horizontal position, filling the mould with said mortar, thereafter positioning the mould in a vertical position with said one side facing upwardly, exerting a pulling force in a vertically upward direction on the parts of the reinforcement projecting beyond the mould to pull the entire reinforcement with the mortar adhering thereto vertically out of the mould through said opening before said mortar hardens thereby exposing said mortar and removing external support from the sides of said element and allowing the structural element to harden outside the mould while being vertically suspended with its reinforcement, whereby said mould is ready for immediate reuse.

4,032,613

REMOVAL OF IRON FROM ALUMINUM NITRATE

Lawrence E. Schultze, Sparks; Donald J. Bauer, Reno, and Judith A. Eisele, Verdi, all of Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Dec. 9, 1975, Ser. No. 639,024

Int. Cl.² C01F *7/66*

U.S. Cl. 423—112 **2 Claims**

1. A process for removal of iron from a concentrated aqueous aluminum nitrate solution, containing about 50 to 56.8 weight percent of aluminum nitrate, consisting of contacting said solution with an extractant from the group consisting of tri-n-butyl phosphate and a solution of about 25 to 90 percent of tri-n-butyl phosphate in an inert diluent, the weight ratio of tri-n-butyl phosphate to aluminum nitrate being about 0.05:1 to about 1:1, whereby the iron is extracted into said extractant.

4,032,614

PROCESS FOR THE DISPOSAL OF ALKALI METALS

Leroy C. Lewis, Arco, Idaho, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 20, 1975, Ser. No. 624,030

Int. Cl.² C01D *1/04*

U.S. Cl. 423—179 **6 Claims**

1. A method for disposing of alkali metals by forming a solid waste for storage comprising:

a. preparing an aqueous disposal solution of at least 55 weight percent alkali metal hydroxide;

b. heating the alkali metal to melting temperature to form a feed solution;

c. spraying the molten feed solution into the disposal solution, the alkali metal reacting with the water in the disposal solution in a controlled reaction producing alkali metal hydroxide, hydrogen and heat, thereby forming a solution of alkali metal hydroxides;

d. adding water to the solution in amounts sufficient to maintain the concentration of alkali metal hydroxides in the solution at 70 to 90 weight percent and to maintain the temperature of the solution at about the boiling point; and

e. removing and cooling the alkali metal hydroxide solution thereby forming a solid waste for storage.

4,032,615

METHOD FOR THE SAFE DISPOSAL OF ALKALI METAL

Terry R. Johnson, Wheaton, Ill., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

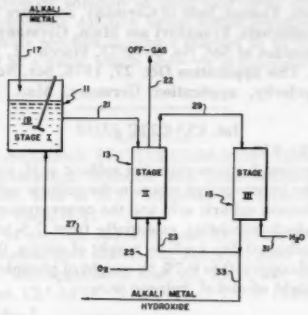
Filed Jan. 27, 1976, Ser. No. 651,981

Int. Cl.² C01D *104*

U.S. Cl. 423—179 **5 Claims**

1. In a method for disposing of molten alkali metal by converting it to alkali metal hydroxide, the improvement comprising dissolving said alkali metal within a melt of a metal selected from the group consisting of lead, bismuth, tin, antimony, cadmium, indium, and alloys of these materials; contacting said melt with a molten salt including hydroxide of said alkali metal and with a gas including oxygen to convert said alkali metal to an alkali metal monoxide dissolved within said salt; separating said salt containing alkali metal monoxide

from said melt; and contacting said salt a gas containing H_2O to convert said alkali metal monoxide to alkali metal hydroxide



whereby hydrogen evolution is nearly eliminated and heat of reaction is evolved in a plurality of reaction steps.

4,032,616

PROCESS FOR THE PRODUCTION OF SODIUM BICARBONATE FROM DIAPHRAM CELL LIQUORS

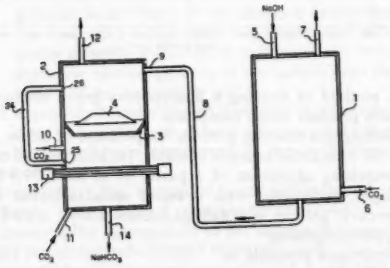
Andre Artur, and Charles Meniere, both of Laneuveville Devant Nancy, France, assignors to Rhone-Poulenc Industries, Paris, France

Filed May 13, 1975, Ser. No. 577,120

Claims priority, application France, May 22, 1974, 74.17783; Feb. 28, 1975, 75.06290

Int. Cl.² C01D 7/07

U.S. Cl. 423—190 **8 Claims**



1. A continuous method for obtaining sodium bicarbonate as crystals of a size to enable easy separation by filtration by the treatment with CO_2 of sodium chloride electrolysis diaphragm cell liquor containing sodium hydroxide and sodium chloride, comprising:

in a first zone treating the cell liquor with a carbon dioxide containing gas in an amount to convert sodium hydroxide to a neutral sodium carbonate which remains in solution;

in a second zone subjecting the solution from the first zone to the action of a carbon dioxide containing gas to precipitate a portion of the sodium carbonate as sodium bicarbonate while maintaining the maximum temperature in said second zone below 70° C;

passing the suspension obtained from the second zone to a third zone whereby bicarbonation is completed by the action of a carbon dioxide containing gas, and cooling the suspension to a final temperature of no more than 45° C; and

finally separating the precipitated sodium bicarbonate, which includes the step of recycling a part of the suspension from the third zone back into the second zone.

4,032,617

BIS(3,5-DIFLUOROSALICYLALDEHYDE)ETHYLENEDIIMINE-Co^{+2} COMPOUND AND USE

Walter A. Gay, Cheshire, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Dec. 3, 1975, Ser. No. 636,905

Int. Cl.² B01D 53/34; C07F 15/06

U.S. Cl. 423—219 **2 Claims**

1. The compound bis(3,5-difluorosalicylaldehyde)ethylenediimine-Co^{+2}.

2. In an oxygen absorbing-desorbing process wherein a chelate is used which absorbs oxygen and upon heating desorbs oxygen, the improvement comprising using as a chelate the compound of claim 1.

4,032,618

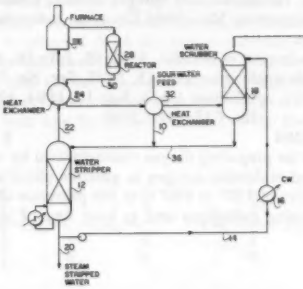
CONVERSION OF AMMONIA INTO HYDROGEN AND NITROGEN BY REACTION WITH A SULFIDED CATALYST

Charles W. Matthews, Denver, Colo., assignor to The United States Energy Research and Development Administration, Washington, D.C.

Filed May 11, 1976, Ser. No. 685,484

Int. Cl.² C01B 21/00, 1/00, 4/00, 6/00

U.S. Cl. 423—351 **1 Claim**



1. In a process for the removal of NH_3 and other contaminants including HCN, COS, CO_2 and H_2S from a coal gasification process wherein said contaminants are contained in water as a liquid waste stream, and wherein said waste stream is stripped with steam to provide a gas stream containing said contaminants and a stripped water stream, the improvement comprising

heating said gas stream containing said contaminants to a temperature of about 700° to 1000° F.;

passing said heated gas stream into contact with a catalyst of cobalt molybdenum sulfide to convert a portion of the NH_3 contained therein to N_2 and H_2;

passing said heated gas stream in heat exchange relationship first with said gas stream to initiate said heating step and then with said liquid waste stream to cool said heated gas and to heat said liquid waste prior to its introduction into the steam stripping step;

scrubbing said gas stream with a first part of said stripped water stream to remove the unconverted portion of said NH_3 therefrom into a scrub water stream;

combining said scrub water stream containing the unconverted NH_3 with said liquid waste stream and steam stripping said combined stream to provide said gas stream containing contaminants and said stripped water stream; and

discharging a second part of said stripped water stream and the scrubbed gas including said other contaminants from said process.

4,032,619

PROCESS FOR THE PREPARATION OF CYANOGEN CHLORIDE

Roy Joseph Laran, Greenwell Springs, La.; H. Paul Loftin, Barrington, R.I., and Daniel C. McIntyre, Baton Rouge, La., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,179
Int. Cl.² C01B 21/18
U.S. Cl. 423—379 3 Claims

1. In a process for the preparation of gaseous cyanogen chloride by a procedure involving reaction of hydrogen cyanide with chlorine in the presence of water with formation of a by-product hydrogen chloride at a concentration of about 10 to 25% by weight, the improvement which comprises converting by chlorination ammonium chloride formed through acid-catalyzed hydrolysis of cyanogen chloride and admixed with the hydrogen chloride by-product to nitrogen trichloride under pressure and at elevated temperature and decomposing the nitrogen trichloride to nitrogen and chlorine thermally or by U.V. radiation.

4,032,620

PROCESS FOR PREPARING DICYAN

Takeru Onada, Yokohama, and Shinpei Tomita, Komae, both of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 594,655, July 10, 1975, abandoned. This application Jan. 13, 1977, Ser. No. 758,994
Claims priority, application Japan, July 18, 1974, 49-82411
Int. Cl.² C01C 3/00
U.S. Cl. 423—384 8 Claims

1. A process for preparing dicyan characterized by reacting prussic acid and molecular oxygen in gaseous phase at reaction temperatures of 150° to 650° C in the presence of a solid catalyst comprising palladium and at least one of tellurium and antimony.

4,032,621

PREPARATION OF HYDROGEN FLUORIDE WITH LOW LEVELS OF ARSENIC, IRON AND SULFITE

Geoffrey Walsh Meadows, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 24, 1975, Ser. No. 634,438
Int. Cl.² C01B 7/22
U.S. Cl. 423—488 6 Claims

1. A process for the preparation of pure anhydrous hydrogen fluoride with lower impurities which comprises sequentially contacting anhydrous hydrogen fluoride containing impurities selected from the group consisting of arsenic, iron and sulfite at ambient temperature with (a) more than the stoichiometric amount of an oxidizing agent selected from the group consisting of alkali metal permanganates and alkali metal dichromates to oxidize the impurities to the non-volatile species; (b) at least a stoichiometric amount based on the amount of unreacted oxidizing agent present of a heavy metal free reducing agent selected from the group consisting of alkali metal percarbonates, alkali metal perborates and hydrogen peroxide to reduce the unreacted oxidizing agent; and (c) distilling the resulting mixture and recovering a high purity anhydrous hydrogen fluoride with decreased impurities.

4,032,622

METHOD OF CONCENTRATING SULFURIC ACID USING A BOILER OF IMPROVED CAST IRON

Helmold von Plessen, Kelkheim, Taunus, and Grete Petrich, Liederbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 557,573, March 12, 1975, abandoned. This application Oct. 27, 1976, Ser. No. 736,079
Claims priority, application Germany, Mar. 14, 1975, 2412353
Int. Cl.² C22C 37/10
U.S. Cl. 423—531 2 Claims

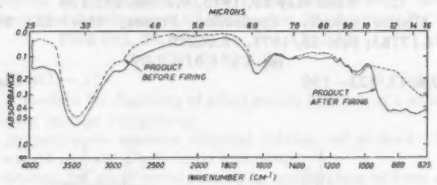
1. In a process for concentrating sulfuric acid, using a concentrator the improvement wherein the sulfuric acid concentrator has therein sulfuric acid and the concentrator is of gray cast iron which consisting essentially from 2.5 to 3.7% by weight of carbon, 0.2 to 1.6% by weight of silicon, 0.6 to 2.5% by weight of copper, 0 to 0.2% by weight of phosphorous, 0 to 3.5% by weight of nickel, balance iron.

4,032,623

HYDROPEROXY GROUP-CONTAINING ALUMINUM COMPOUND AND METHOD OF MAKING THE SAME

George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Continuation-in-part of Ser. No. 331,766, Feb. 12, 1973, abandoned. This application Aug. 16, 1976, Ser. No. 714,829
The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.
Int. Cl.² C01F 7/00, 7/02
U.S. Cl. 423—582 9 Claims



1. A method of forming a hydroperoxy-group containing aluminum product which comprises:

contacting and reacting at room temperature or below, and in the substantial absence of water, (a) an activated metal comprising aluminum of a purity of at least 99.9% by weight, permeated with a liquid metal selected from mercury, gallium and gallium/indium alloys, with (b) a liquid comprising:

i. hydrogen peroxide in

ii. a liquid organic compound having no multiple carbon-to-carbon bonds and which is non-reactive with said activated metal under the conditions of the reaction.

9. The product prepared by the process of claim 1 having the infrared spectra shown for the product before firing in FIG. 3.

4,032,624

PROCESS FOR PREPARING PURE SILVER CHROMATE FOR ELECTROCHEMICAL CELLS

André Lecerf, Pace, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Continuation of Ser. No. 612,454, Sept. 11, 1975, abandoned, which is a continuation of Ser. No. 397,918, Sept. 17, 1973, abandoned. This application Sept. 15, 1976, Ser. No. 723,586
Claims priority, application France, Sept. 26, 1972, 72.34056
Int. Cl.² C01G 37/14
U.S. Cl. 423—595 15 Claims

1. A process of preparing silver chromate of greater than 99.5% purity for use as a positive active material in an electro-

chemical generator having a lithium negative electrode and a non-aqueous electrolyte comprising reacting concentrated chromate and silver salt solutions in the presence of a concentrated bichromate solution to yield said silver chromate, at least said chromate solution being added progressively into the bichromate solution in such a manner as to maintain the pH thereof at a value which prevents precipitation of silver oxide.

4,032,625

BONE-SEEKING TECHNETIUM-99M COMPLEX

Gopal Subramanian, Manlius, and John Gilmore McAfee, Fayetteville, both of N.Y., assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 368,473, June 11, 1973, which is a continuation-in-part of Ser. No. 263,171, June 15, 1972, abandoned. This application Mar. 26, 1975, Ser. No. 562,099

Int. Cl.² A61K *29/00*, *43/00*; C07F *13/00*

U.S. Cl. 424—1 3 Claims

1. A bone-seeking composition comprising a solution of technetium-99m-tin-methylene diphosphonate complex or technetium-99m-tin-1-aminoethane-1,1-diphosphonate complex in an aqueous medium suitable for intravenous administration.

4,032,626

REAGENT AND METHOD FOR TBG ASSAY

Frank B. Ward, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed June 30, 1976, Ser. No. 701,193

Int. Cl.² G01N *33/00*; A61K *39/00*

U.S. Cl. 424—1 11 Claims

1. A method of determining the concentration of thyroxine binding globulin is a fluid sample, the method comprising the steps of:

A. incubating the sample with

i. a composite comprising antibodies to thyroxine binding globulin immobilized on an insoluble carrier material, the incubation being under conditions, and with composite quantity sufficient to complex substantially all thyroxine binding globulin in the sample onto the antibodies of the composite; and

ii. a quantity of radiolabeled thyroxine in a quantity sufficient to complex with at least a portion of the thyroxine binding globulin complexed to the antibodies of the composite;

B. separating the composite and materials complexed thereto from unbound radiolabeled thyroxine;

C. counting the radioactivity of the separated composite or the remaining radiolabeled thyroxine; and

D. correlating the count of step (C) with a standard curve relating concentrations of thyroxine binding globulin to counts of the type determined by step (C).

7. A reagent for determining the concentration of thyroxine binding globulin in a fluid sample, the reagent being an immunochemical composite comprising antibodies to thyroxine binding globulin attached to the surfaces of an essentially water insoluble carrier material.

4,032,627

TOOTH WHITENING COSMETIC COMPOSITION

Joseph T. Suchan, Freehold, and Vincent A. Burell, Bloomsbury, both of N.J., assignors to Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.

Continuation-in-part of Ser. No. 347,102, April 2, 1973, abandoned. This application Aug. 6, 1975, Ser. No. 602,604

Int. Cl.² A61K *7/22*

U.S. Cl. 424—54 8 Claims

1. A non-toxic tooth whitening composition consisting essentially of the following component solutions:

A. a first component comprising zinc oxide, approximately 6.3 percent; ammonium hydroxide, approximately 17.1 percent; ammonium carbonate, approximately 11.3 percent; with the balance water;

B. a second component comprising said first component as approximately 9.85 percent; a 70% solution of a mucilaginous bodying material, capable of functioning as a film forming agent, in isopropyl alcohol approximately 39.4 percent; methyl cellulose approximately 1.5 percent; with the balance ethanol; said second component comprising 70 percent of the total composition;

C. a third component comprising; said second component as approximately 70 percent; a non-toxic yellow food dye solution, approximately 15 percent; titanium dioxide, approximately 4 percent; with the balance ethanol.

4,032,628

COSMETIC EMULSION COMPOSITIONS INCLUDING BLOCK POLYMER EMULSIFIERS

Christos Papantoniou, Epinay-sur-Seine, and Rose-Marie Handjani, Paris, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Continuation of Ser. No. 294,923, Oct. 4, 1972, abandoned, which is a continuation-in-part of Ser. No. 131,810, April 6, 1971, abandoned. This application Nov. 5, 1975, Ser. No. 628,906

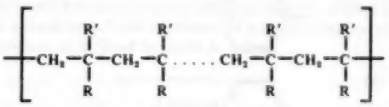
Claims priority, application France, Oct. 6, 1971, 71.36878; Apr. 7, 1970, 70.60676

Int. Cl.² A61K *7/00*, *7/02*, *7/021*

U.S. Cl. 424—63 14 Claims

1. A cosmetic composition in the form of a cream, a color base or a milk comprising an emulsion of an oil phase and a water phase emulsified with an emulsifying agent, wherein said oil is selected from the group consisting of animal oil, vegetable oil, hydrocarbon oil and mixtures thereof and wherein said emulsifying agent consists essentially of at least one block polymer containing:

A. at least one lipophilic sequence of the formula

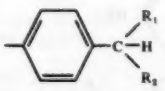


wherein R′ is selected from the group consisting of hydrogen and methyl, and wherein when R′ is hydrogen, R is selected from the group consisting of:

(a)

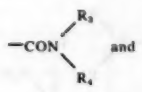
and

(b)



and wherein when R′ is methyl, R is selected from the group consisting of

(c)



and

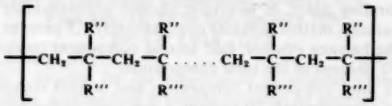
d. — COO R_3

and wherein

R_1 and R_2, each independently, represent a member selected from the group consisting of hydrogen and alkyl having 1 to 4 carbon atoms,

R_3 is alkyl containing 6 to 18 carbon atoms,

R_4 is selected from the group consisting of methyl and ethyl, and R_5 is lauryl, and (b) at least one hydrophilic sequence of the formula



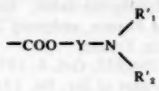
wherein

R''' is selected from the group consisting of hydrogen and methyl, and wherein when R''' is methyl,

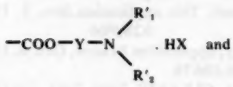
R'' is selected from the group consisting of

a. — COOH

(b)



(c)



and

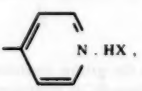
d. — C N

when R''' is hydrogen, R'' is selected from the group consisting of

(e)

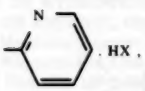
(f)

(g)

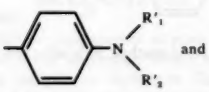


(h)

(i)

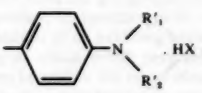


(j)



and

(k)



R'_1 and R'_2, each independently selected from the group consisting of hydrogen and lower alkyl having 1 to 4 carbon atoms,

Y is selected from the group consisting of a saturated hydrocarbon chain having 2–4 carbon atoms and a hydrocarbon chain having 2–4 carbon atoms interrupted by a heteroatom selected from the group consisting of oxygen and sulfur, and

HX represents a mineral or organic acid selected from the group consisting of hydrochloric acid, hydrobromic acid, lactic acid and acetic acid.

4,032,629

SKIN TREATING AGENT CONTAINING POLYALDEHYDOPOLYCARBOXYLATE POLYMERS AND PROCESS

Rainer Osberghaus, Dusseldorf-Urdenbach, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

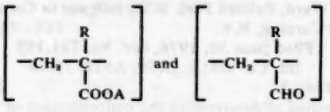
Filed Jan. 28, 1975, Ser. No. 544,810

Claims priority, application Germany, Apr. 20, 1974, 2419046

Int. Cl.² A61K *31/74, 31/78*

U.S. Cl. 424—78 **10 Claims**

1. A cosmetic composition for maintaining a certain hygroscopicity for the protection of the skin of warm-blooded animals consisting essentially of an emulsion selected from the group consisting of oil-in-water and water-in-oil, having a pH between 5 and 7 and containing an emulsifier, water, from 1 to 20% by weight of at least one polyaldehydopolycarboxyl polymer having a polymer chain containing substantially units selected from the group consisting of



wherein A is a member selected from the group consisting of hydrogen, alkali metal, ammonium, lower alkyl ammonium and lower alkylolammonium and R is a member selected from the group consisting of hydrogen and alkyl having from 1 to 6 carbon atoms, said units being present in any order in said polymer chain, said polyaldehydopolycarboxyl polymer having a ratio of —COOA groups to C=O groups of from 0.5:1 to 16:1 and a degree of polymerization of from 3 to 100, and the remainder inert cosmetic excipients.

4,032,630

SKIN TREATING AGENT CONTAINING POLYHYDROXYPOLYCARBOXYLATE POLYMERS AND PROCESS

Rainer Osberghaus, Dusseldorf-Urdenbach; Wilfried Umbach, Langenfeld; Christian Gloxhuber, Haan, and Siegfried Braig, Hilden, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

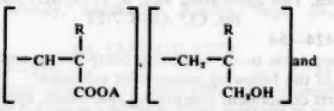
Filed Jan. 28, 1975, Ser. No. 544,813

Claims priority, application Germany, Jan. 29, 1974, 2404046

Int. Cl.² A61K *31/78*

U.S. Cl. 424—81 **13 Claims**

1. A cosmetic moisturizing composition for the care and protection of the skin of warm-blooded animals consisting essentially of an emulsion adjusted to a pH between 5 and 7 containing an emulsifier, from 1 to 20% by weight of at least one polyhydroxypolycarboxyl polymer having a polymer chain containing from 55 to 100% of first units selected from the group consisting of



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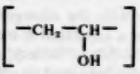
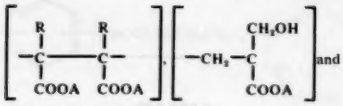
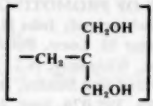


and from 0 to 45% of second units selected from the group consisting of



and



wherein A is a member selected from the group consisting of hydrogen, alkali metal, ammonium, lower alkyl ammonium and lower alkylolammonium and R is a member selected from the group consisting of hydrogen and alkyl having from 1 to 6 carbon atoms, said units being present in any order in said polymer chain, said polyhydroxypolycarboxyl polymer having a ratio of —COOA groups to —OH groups of from 0.5:1 to 16:1 and a degree of polymerization of from 3 to 200; and the remainder inert cosmetic excipients, said emulsion being selected from the group consisting of oil-in-water emulsions and water-in-oil emulsions.

4,032,631

MIXTURE OF ANTIBIOTICS PRODUCED BY NEW SPECIES OF MICROMONOSPORA

Walter D. Celmer, New London; Walter P. Cullen, East Lyme; Charles E. Moppett, Mystic; John R. Oscarson, Groton; John B. Routien, Lyme, all of Conn.; Riichiro Shibąkawa, and Junsuke Tone, both of Aichi, Japan, assignors to Pfizer Inc., New York, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,296

Int. Cl.² A61K *35/74*

U.S. Cl. 424—120 **4 Claims**

1. Antibiotic substance Compound 42,752 which is soluble in chloroform, methylisobutyl ketone, dimethylsulfoxide and dimethylformamide; moderately soluble in methanol and ethanol; and insoluble in hexane, heptane and water; has absorption maxima in dioxane in the ultraviolet light region of the spectrum at 264, 324 and 500 mμ with $E_{1cm}^{1\%}$ values of 345, 265 and 20, respectively; has the average composition by weight of 61.11% carbon, 5.58% hydrogen, 3.81% nitrogen and 29.50% oxygen (by difference); and when pelleted in KBr exhibits characteristic absorption in the infrared region at the following wavelengths in microns: 3.00, 3.42, 5.82, 6.00, 6.14, 6.20, 6.37, 6.62, 7.25, 7.58, 7.82, 8.92, 9.22, 9.75, 10.00, 10.75, 11.55 and 13.65.

4,032,632

MIXTURE OF ANTIBIOTICS PRODUCED BY NEW SPECIES OF STREPTOSPORANGIUM

Walter D. Celmer, New London; Walter P. Cullen, East Lyme; Charles E. Moppett, Mystic; John B. Routien, Lyme; Mark T. Jefferson, Waterford, all of Conn.; Riichiro Shibakawa, Handa, and Junsuke Tone, Chita, both of Japan, assignors to Pfizer Inc., New York, N.Y.

Filed July 23, 1976, Ser. No. 708,181

Int. Cl.² A61K *35/74*

U.S. Cl. 424—121 **3 Claims**

2. Antibiotic substance Compound 43,334 which is soluble in methanol, ethanol, chloroform, ethyl acetate, acetone and methylisobutyl ketone; insoluble in hexane, heptane and water; has absorption maxima in methanol in the ultraviolet light region of the spectrum at 240, 280 and 307 nm with $E_{1cm}^{1\%}$ values of 95, 47 and 26, respectively; has the average composition by weight of 60.63% carbon, 6.87% hydrogen, 10.42% nitrogen and 22.08% oxygen (by difference); has an optical rotation of $\alpha_D - 73°$ (c = 1.0, methanol); and in chloroform solution exhibits characteristic absorption in the infrared region at the following wavelengths in microns: 2.95, 3.05, 3.12, 3.45, 5.79, 6.02, 6.13, 6.70, 7.04, 8.03, 8.92, 9.10 and 11.02.

4,032,633

POLYPEPTIDES

Harold Gregory, Macclesfield, and Beryl Margaret Preston, Knutsford, both of England, assignors to Imperial Chemical Industries Limited, London, England

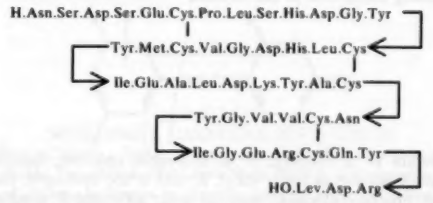
Filed Aug. 18, 1975, Ser. No. 605,299

Claims priority, application United Kingdom, Sept. 11, 1974, 39599/74

Int. Cl.² A61K *37/00*

U.S. Cl. 424—177 **5 Claims**

1. The polypeptide of the formula:



or its reduction product in which the cystine residues are reduced to cysteine residues.

5. A method of inhibiting the secretion of acidic gastric juice in warm blooded animals which comprises administering to said animal an effective amount of a polypeptide or reduction product as defined in claim 1.

4,032,634

O,O-DIALKYL-O-(1-PHENYL-2-CARBALKOXYVINYL)-THIONOPHOSPHORIC ACID ESTERS AND INSECTICIDAL AND ACARICIDAL COMPOSITIONS AND METHOD OF USE THEREOF

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel; Rolf Schroder, all of Wuppertal; Paul Uhrhan, Cologne; Bernhard Homeyer, Leverkusen; Wolfgang Behrenz, Overath-Steinenbrueck, and Ingeborg Hammann, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

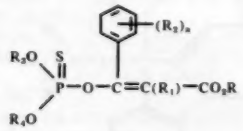
Filed Aug. 11, 1976, Ser. No. 713,738

Claims priority, application Germany, Aug. 20, 1975, 2537047

Int. Cl.² A01N *9/36*; **C07F** *9/165*, *9/18*

U.S. Cl. 424—212 **10 Claims**

1. An O,O-dialkyl-O-(1-phenyl-2-carbalkoxyvinyl)-thionophosphoric acid ester of the formula



in which

R, R_3 and R_4, each independently is alkyl with 1 to 6 carbon atoms,

R_1 is hydrogen or methyl,

R_2 is alkyl, alkoxy or alkylthio each with 1 to 4 carbon atoms, cyano, halogen or phenyl, and

n is 1, 2, 3, 4 or 5.

9. A method of combating insects or acarids which comprises applying to the insects or acarids, or to a habitat thereof, an insecticidally or acaricidally effective amount of a compound according to claim 1.

4,032,635

PHARMACEUTICAL METHOD FOR THE THERAPY OF IMMUNE DISEASES

Hamao Umezawa; Tomio Takeuchi, both of Tokyo; Akira Takamatsu, Yokohoma, and Shunro Mori, Fujisawa, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Japan

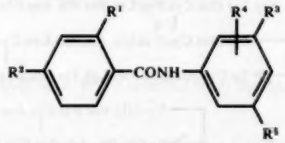
Filed Feb. 24, 1976, Ser. No. 660,731

Claims priority, application Japan, June 12, 1975, 50-71629

Int. Cl.² A61K *31/60*

U.S. Cl. 424—230 **12 Claims**

1. The method for chemotherapeutically treating immune diseases and disorders which comprises administering to a living animal a pharmaceutical composition to suppress the immune response comprising an effective amount of a suppressing compound of the formula



wherein R^1 is hydroxy; R^2 is hydrogen, chlorine, fluorine, trifluoromethyl or lower alkyl; R^3 and $R^5$are hydrogen, fluorine, bromine, chlorine, nitro, or lower alkyl and R^4 is substituted at either the 2′ or 4′ position and is hydroxyl or lower alkoxy with 1 to 4 carbon atoms and lower alkyl as used herein being a straight or branched chain saturated hydrocarbon with 1 to 4 carbon atoms in combination with a pharmaceutically acceptable nontoxic carrier.

4,032,636

IMIDAZOLYLACETIC ACID AMIDES, THEIR PRODUCTION, ANTIMYCOTIC COMPOSITIONS COMPRISING SAID COMPOUNDS AND THEIR USE AS ANTIMYCOTIC AGENTS

Jurgen Wenzelburger; Karl Heinz Buchel; Manfred Plempel, and Werner Meiser, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

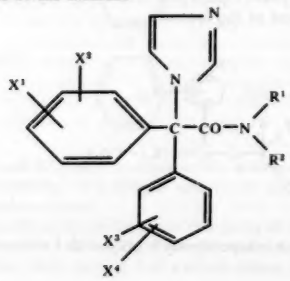
Division of Ser. No. 594,195, July 9, 1975, which is a division of Ser. No. 400,263, Sept. 24, 1973, Pat. No. 3,950,354. This application Jan. 22, 1976, Ser. No. 651,419

Claims priority, application Germany, Sept. 26, 1972, 2247187

Int. Cl.² A61K *31/54*

U.S. Cl. 424—246 **28 Claims**

1. A pharmaceutical composition useful for treating mycotic infections in humans and animals which comprises an antimycotically effective amount of an imidazolylacetic acid amide of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R^1 and R^2, together with the nitrogen atom to which they are attached form a saturated 6-membered heterocyclic ring containing a $—SO_2—$ moiety, said heterocyclic ring being otherwise unsubstituted or substituted by alkyl of 1 to 4 carbon atoms or phenyl, and

X^1, X^2, X^3 and X^4 are the same or different and are each hydrogen or halogen;

in combination with a pharmaceutically acceptable, nontoxic, carrier.

4,032,637

METHOD OF PROMOTING SLEEP

René Spiegel, Basel, Switzerland; John H. Gogerty, Randolph Township, N.J.; Dieter M. Loew, Bottmingen, Switzerland, and Phillip L. Eden, Whippany, N.J., assignors to Sandoz Ltd., Basel, Switzerland and Sandoz, Inc., E. Hanover, N.J.

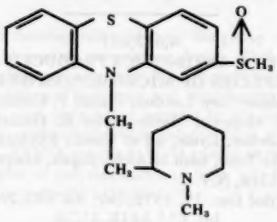
Continuation of Ser. No. 399,076, Sept. 20, 1973, abandoned. This application Oct. 31, 1974, Ser. No. 519,570

Claims priority, application Switzerland, Sept. 26, 1972, 14031/72

Int. Cl.² A61K *31/54*

U.S. Cl. 424—247 **5 Claims**

1. A method of promoting sleep in animals, which comprises administering to an animal suffering from insomnia a sleep promoting effective dose of 10-[2-(1-methyl-2-piperidyl)ethyl]-2-methylsulphinylphenothiazine of formula:



in free base form or in pharmaceutically acceptable acid addition salt form thereof.

4,032,638

HETEROCYCLIC UREAS

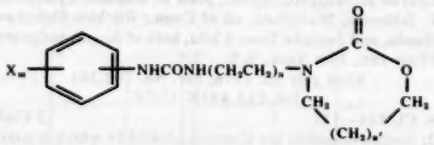
Edward Koon Wah Wat, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 518,871, Oct. 29, 1974, abandoned, which is a division of Ser. No. 354,871, April 25, 1973, abandoned. This application Apr. 3, 1975, Ser. No. 564,836

Int. Cl.² A01N *9/00, 9/22*; C07D *265/00, 273/00*

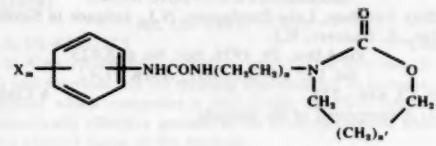
U.S. Cl. 424—248.54 **11 Claims**

1. A compound of the formula



wherein
X = F[,Cl] or OCH_3;
m = 0, 1 or 2; and
n and *n'* each = 0 or 1.

8. A composition to protect plants against atmospheric ozone comprising an amount sufficient to protect plants against said ozone of a compound of the formula



wherein
X = F[,Cl,] or OCH_3;
m = 0, 1 or 2; and
n and *n'* each = 0 or 1 and a suitable carrier therefor.

4,032,639

2,3,4,4a-TETRAHYDRO-1H-PYRAZINO[1,2-a]QUINOXALIN-5(6H)-ONES AND DERIVATIVES THEREOF FOR RELIEVING HYPERTENSION

Meier E. Freed, Paoli, and John R. Potoski, Spring City, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 668,872
Int. Cl.[2] A61K *31/505*
U.S. Cl. 424—251 12 Claims

1. A method for relieving hypertension in warm-blooded animals which comprises administering to an animal in need thereof a hypotensive effective amount of a compound selected from the group consisting of:
2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
2,3,4,4a-tetrahydro-6-methyl-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
2,3,4,4a-tetrahydro-9-methoxy-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
7-chloro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
8-chloro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
9-chloro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
2,3,4,4a-tetrahydro-8-trifluoromethyl-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
2,3,4,4a-tetrahydro-9-methyl-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
7-fluoro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one;
8-fluoro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one; and
9-fluoro-2,3,4,4a-tetrahydro-1H-pyrazino[1,2-a]quinoxalin-5(6H)-one.

4,032,640

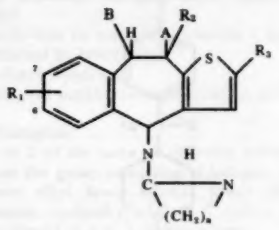
4H-BENZO[4,5]CYCLOHEPTA[1,2-B]THIOPHENES

Jean-Michel Bastian, Therwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed June 9, 1976, Ser. No. 694,152
Claims priority, application Switzerland, June 16, 1975, 7762/75
Int. Cl.[2] C07D *409/12*
U.S. Cl. 424—263 21 Claims

1. A compound of formula I,

-continued



wherein
R_1 is hydrogen, halogen of atomic number from 9 to 35, alkyl of 1 to 4 carbon atoms, or alkoxy of 1 to 4 carbon atoms,
R_2 is hydrogen or alkyl of 1 to 4 carbon atoms,
R_3 is hydrogen, chlorine, or alkyl of 1 to 4 carbon atoms,
either A and B are each hydrogen or together a single bond, and
n is a whole number from 3 to 7, in the form of free base or in the form of a pharmaceutically acceptable acid addition salt thereof.

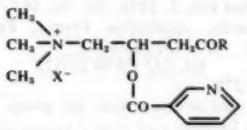
4,032,641

NICOTINOYL CARNITINE DERIVATIVES

Ichiro Chibata, Suita; Munetsugu Miyoshi, Nishinomiya; Kohki Takashima, Shiki, and Shoji Moriya, Takarazuka, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed June 9, 1976, Ser. No. 694,363
Int. Cl.[2] A61K *31/455;* C07D *213/55, 213/56*
U.S. Cl. 424—266 13 Claims

1. A compound of the formula:



wherein R is lower alkoxy, benzyloxy or amino and X is an anionic residue of a pharmaceutically acceptable acid, or a pharmaceutically acceptable acid addition salt of said compound.

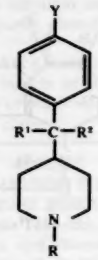
4,032,642

1-SUBSTITUTED-4-BENZYLPIPERIDINES

Robert Louis Duncan, Jr., and Robert Frederick Boswell, Jr., both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Division of Ser. No. 531,832, Dec. 11, 1974, Pat. No. 3,956,296. This application Jan. 27, 1976, Ser. No. 652,683
Int. Cl.[2] A61K *31/445*
U.S. Cl. 424—267 34 Claims

1. A pharmaceutical composition useful for its sedative and tranquilizing effects comprising
a. 1 to 200 mg. of a compound selected from the group consisting of a 1-substituted-4-benzylpiperidine of the formula



wherein;

R is selected from the group consisting of p-fluorobenzoylpropyl, p-acetyl-o-methoxyphenoxypropyl, carbamoyl, N-lower-alkylcarbamoyl, N,N-dilower-alkylcarbamoyl, N-phenylcarbamoyl, N-(m-trifluoromethylphenyl)carbamoyl, N-(ω-morpholino)lower-alkylcarbamoyl, N-[ω-(2-pyridyl)lower-alkyl]carbamoyl, 2-hydroxy-3-(o-methoxyphenoxy)propyloxycarbonyl, 2-carbamoylethyl or 4-(p-fluorobenzoyl)piperidinoethyl,

R^1 is selected from the group consisting of hydrogen or hydroxy,

R^2 is selected from the group consisting of phenyl, p-fluorophenyl, m-trifluoromethylphenyl or cyclohexyl,

Y is selected from the group consisting of hydrogen or fluorine,

with the proviso that when Y is hydrogen and R^2 is phenyl, R is other than p-fluorobenzoylpropyl, and a pharmaceutically acceptable acid addition salt of a basic compound thereof, and

b. a pharmaceutically acceptable carrier therefor.

4,032,643

NOVEL THIAZOLE DERIVATIVES

Andre Poittevin, Vaires-sur-Marne, and Vesperto Torelli, Maisons-Alfort, both of France, assignors to Roussel-UCLAF, Paris, France

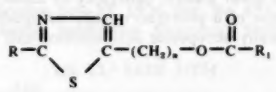
Filed Feb. 2, 1976, Ser. No. 654,630

Claims priority, application France, Feb. 14, 1975, 75.04627; Dec. 12, 1975, 75.38063

Int. Cl.² C07D *277/22*

U.S. Cl. 424—270 **15 Claims**

1. A compound selected from the group consisting of a thiazole of the formula



wherein R is alkyl of 1 to 5 carbon atoms and R_1 is selected from the group consisting of $-NH_2$, $-NH$-AlK,

phenylamino and diphenylamino, AlK is alkyl of 1 to 4 carbon atoms and *n* is an integer from 1 to 6 and their non-toxic, pharmaceutically acceptable acid addition salts.

8. A hypolipemiant composition comprising a hypolipemically effective amount of at least one compound of claim 1 and a pharmaceutical carrier.

9. A method of inducing hypolipemic acitivity in warm-blooded animals comprising administering to warm-blooded animals a hypolipemically effective amount of at least one compound of claim 1.

4,032,644

ISOXAZOLYL BENZOIC ACIDS

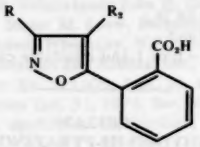
Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Dec. 29, 1975, Ser. No. 645,023

Int. Cl.² C07D *263/32;* **A61K** *31/42*

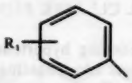
U.S. Cl. 424—272 **6 Claims**

1. A compound of the formula



where

R represents t-butyl or R_1



and

R_1 represents hydrogen, fluoro or chloro, lower alkyl having 1 to 4 carbon atoms, or lower alkoxy having 1 to 4 carbon atoms, and

R_2 represents hydrogen or straight chain lower alkyl having 1 to 4 carbon atoms

or a pharmaceutically acceptable salt thereof.

6. A method of treating lipidemia which comprises administering to a mammal in need of said treatment a hypolipidemic effective amount of a compound of claim 1.

4,032,645

INJECTABLE METRONIDAZOLE COMPOSITION

Yie W. Chien, Skokie, and Dianne M. Jefferson, Chicago, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed June 19, 1975, Ser. No. 588,211

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 **4 Claims**

1. An injectable metronidazole composition having 500–650 mg./10 ml. metronidazole in a solvent system comprising:

25–35% v/v N,N-dimethylacetamide

40–60% v/v ethanol

10–30% v/v aqueous buffer

or

15–25% v/v N,N-dimethylacetamide

40–60% v/v ethanol

10–30% v/v aqueous buffer

and including one of the following:

1–5% w/v nicotinamide

5–15% v/v propylene glycol

5–15% v/v 2,2-dimethyl-1,3-dioxolane-4-methanol

said aqueous buffer maintaining the pH of the injectable metronidazole composition at 5.0–7.5.

4,032,646
PYRAZOL-5-ONES

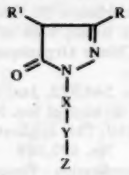
Eike Möller; Karl Meng, both of Wuppertal; Egbert Wehinger, Neviges, and Harald Horstmann, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 459,407, April 9, 1974, Pat. No. 3,949,083. This application Sept. 4, 1975, Ser. No. 610,150
Claims priority, application Germany, Apr. 17, 1973, 2319281

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 **37 Claims**

1. A pharmaceutical composition useful for effecting diuresis and saluresis and for treating hypertension in humans and animals which comprises a diuretically effective amount, a saluretically effective amount or an antihypertensive amount of a pyrazol-5-one of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R is amino

R^1 is lower alkyl, alkenyl of 2 to 4 carbon atoms phenyl or benzyl unsubstituted or nuclear substituted by 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, lower alkenoxy, halogen, nitro, cyano and trifluoromethyl;

X is methylene or methylene wherein 1 hydrogen atom is substituted by lower alkyl

Y is a direct bond; and

Z is phenyl or naphthyl unsubstituted or nuclear substituted by:

a. 3 halogens;

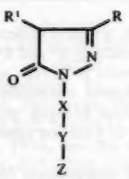
b. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkenyl, lower alkoxy, lower alkenoxy, cycloalkyl of 5 to 7 carbon atoms and cycloalkenyl of 5 to 7 carbon atoms;

c. nitro; and

d. nitro and 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halogen, and trifluoromethyl,

in combination with a pharmaceutically acceptable nontoxic inert diluent or carrier.

20. A method of effecting diuresis or saluresis or treating hypertension in humans and animals which comprises administering to a human or animal in need thereof a diuretically effective amount, a saluretically effective amount or an antihypertensive amount of a compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R is amino;

R^1 is lower alkyl, alkenyl of 2 to 4 carbon atoms or phenyl or benzyl unsubstituted or nuclear substituted by 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, lower alkenoxy, halogen, nitro, cyano and trifluoromethyl;

X is methylene or methylene wherein 1 hydrogen atom is substituted by lower alkyl;

Y is a direct bond; and

Z ia phenyl or naphthyl unsubstituted or nuclear substituted by:

a. 3 halogens;

b. 1 or 2 of the same or different substituents selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkenyl, lower alkoxy, lower alkenoxy, cycloalkyl of 5 to 7 carbon atoms and cycloalkenyl of 5 to 7 carbon atoms;

c. nitro; and

d. nitro and 1 or 2 of the same or different substituents selected from the group consisting of lower alkyl, lower alkenyl, lower alkoxy, halogen, and trifluoromethyl

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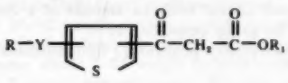
4,032,647
SUBSTITUTED THENOYLACETIC ACID AND ESTERS

Roger Alan Parker, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

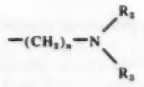
Filed June 16, 1975, Ser. No. 587,117
Int. Cl.² A01N *9/00*; **C07D** *333/16*

U.S. Cl. 424—275 **12 Claims**

1. A compound selected from the formula:



wherein Y is selected from oxygen and divalent sulfur; R is selected from a straight or branched saturated hydrocarbon chain containing from 10 to 20 carbon atoms and a straight or branched unsaturated hydrocarbon chain containing from 10 to 20 carbon atoms and from 1 to 4 double bonds; R_1 is selected from hydrogen, a straight or branched lower alkyl chain of from 1 to 6 carbon atoms, benzyl, phenethyl, and the group



wherein *n* is the integer 2 or 3; R_2 is selected from a straight or branched lower alkyl chain of from 1 to 4 carbon atoms; R_3 is selected from hydrogen and a straight or branched lower alkyl chain of from 1 to 4 carbon atoms with the proviso that when R_3 is hydrogen, R_2 is alkylcarbonyl and pharmaceutically acceptable salts thereof.

4,032,648
METHOD AND COMPOSITIONS CONTAINING THIOCHROMAN COMPOUNDS FOR TREATING CARDIAC RHYTHM DISORDERS

Charles Malen, Fresnes, and Michel Laubie, Vaucresson, both of France, assignors to Science Union et Cie, Suresnes, France

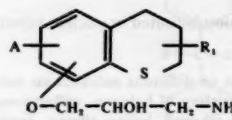
Division of Ser. No. 130,010, March 31, 1971, Pat. No. 3,960,891. This application Apr. 22, 1976, Ser. No. 679,343
Claims priority, application United Kingdom, Apr. 6, 1970, 16118/70

Int. Cl.² A61K *31/38*

U.S. Cl. 424—275 **14 Claims**

1. A pharmaceutical composition suitable for use in the treatment of disorders of cardiac rhythm, containing as active principle at least one compound selected from the group consisting of:

a. (3-amino-2-hydroxy propyloxy) thiochromans of the formula



wherein:

A is selected from the group consisting of hydrogen and halogen;

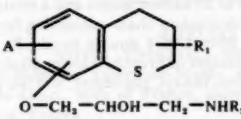
R_1 is selected from the group consisting of hydrogen and lower alkyl containing from 1 to 5 carbon atoms inclusive; and

R_2 is selected from the group consisting of linear and branched lower alkyl containing from 1 to 5 carbon atoms inclusive and cyclo lower alkyl containing from 3 to 6 carbon atoms inclusive; and having the (3-amino-2-hydroxy propyloxy) group bonded to the thiochroman in the 6,7 or 8 position; and

b. physiologically tolerable acid addition salts thereof, in an amount effective for said purpose, together with a suitable pharmaceutical carrier therefor.

7. A method of treating a living animal body afflicted with a disorder of the cardiac rhythm comprising the step of administering to such animal body an amount of a compound selected from the group consisting of:

a. (3-amino-2-hydroxy propyloxy) thiochromans of the formula



wherein:

A is selected from the group consisting of hydrogen and halogen;

R_1 is selected from the group consisting of hydrogen and lower alkyl containing from 1 to 5 carbon atoms inclusive; and

R_2 is selected from the group consisting of linear and branched lower alkyl containing from 1 to 5 carbon atoms inclusive and cyclo lower alkyl containing from 3 to 6 carbon atoms inclusive; and having the (3-amino-2-hydroxy propyloxy) group bonded to the thiochroman in the 6,7 or 8 position; and

b. physiologically tolerable acid addition salts thereof, which is effective for alleviation of said condition.

4,032,649

2,3-DIHYDRO-2,2-DIMETHYL-7-BENZO[b]THIENYL N-METHYLCARBAMATE AND USE AS AN INSECTICIDE

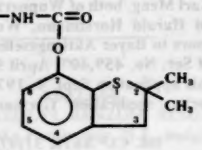
Gary M. Singerman, Allegheny County, Pa., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Nov. 12, 1975, Ser. No. 631,009

Int. Cl.² C07D *333/64*

U.S. Cl. 424—275 **3 Claims**

1. The insecticidal compound 2,3-dihydro-2,2-dimethyl-7-benzo[b]thienyl N-methylcarbamate having the structural formula



4,032,650

METHOD OF TREATING FATIGUE BY ADMINISTERING A GULONIC ACID SALT

Jean Louis Molle, Villeurbanne St. Georges, and Jean Christian Boch, Neris les Bains, both of France, assignors to A.E.C. Societe de Chimie Organique et Biologique, Paris, France

Division of Ser. No. 544,572, Jan. 27, 1975, Pat. No. 3,973,031, which is a division of Ser. No. 396,803, Sept. 13, 1973, Pat. No. 3,910,960. This application June 3, 1976, Ser. No. 692,509

Claims priority, application France, Sept. 15, 1972, 72.32896

Int. Cl.² A61K *31/335*

U.S. Cl. 424—278 **2 Claims**

1. Method for the treatment of fatigue in a person, which comprises administering to the person an effective amount of calcium diacetone-2-ketogulonate.

4,032,651

3,3a,6,6a-TETRAHYDROFURO[3,4-b]FURAN DERIVATIVES AND ANTI-ULCER COMPOSITION CONTAINING THEM

David Cecil Aldridge; Graham Charles Crawley, and Colin John Strawson, all of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

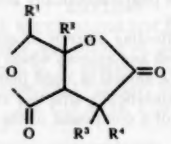
Filed Sept. 11, 1975, Ser. No. 612,531

Claims priority, application United Kingdom, Sept. 27, 1974, 42040/74

Int. Cl.² C07D *493/04*

U.S. Cl. 424—279 **4 Claims**

1. A 3,3a,6,6a-tetrahydrofuro[3,4-b]furan-2,4-dione of the formula:



wherein R^1 is hydrogen, an alkyl radical of from 1 to 10 carbon atoms or a phenyl radical; R^2 and R^3 are hydrogen; and R^4 is a radical of the formula R^5SCH_2 - wherein R^5 is a benzyl radical or a phenyl radical optionally bearing one or two substituents selected from halogen atoms, alkyl and alkoxy radicals each of from 1 to 4 carbon atoms, and carboxylic acid radicals.

2. A pharmaceutical composition for internal use for the treatment of gastric or duodenal ulcers which comprises as active ingredient an effective amount of a compound according to claim 1 and a pharmaceutically-acceptable carrier.

4. A method for the treatment of duodenal or gastric ulcers in warm-blooded animals, which comprises administering to the said animal an effective amount of a composition as claimed in claim 1.

4,032,652

SUBSTITUTED 2H-PYRAN-2,6(3H)-DIONE DERIVATIVES, PHARMACEUTICAL COMPOSITIONS COMPRISING SUCH DERIVATIVES AND METHODS OF INHIBITING THE ANTIGEN-ANTIBODY REACTION

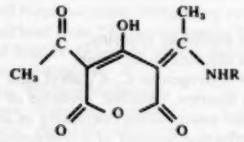
Lawrence W. Chakrin, Haddonfield, N.J.; Kenneth M. Snader, Hatboro, Pa., and Chester R. Willis, Kingston, British W. Indies, assignors to SmithKline Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 570,896, April 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 492,640, July 29, 1974, abandoned. This application Apr. 30, 1976, Ser. No. 682,001

Int. Cl.² A61K *31/35*; C07D *309/20*

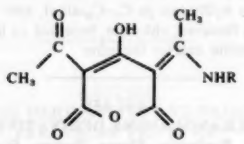
U.S. Cl. 424—283 21 Claims

1. A pharmaceutical composition for inhibiting the symptoms of asthma comprising a nontoxic pharmaceutical carrier or diluent and an amount sufficient to produce said inhibition of a compound represented by the formula:



wherein R is lower alkyl, straight or branched chain, of from 3 to 6 carbon atoms, phenyl, halophenyl, hydroxyphenyl, methoxyphenyl, alkanoyloxyphenyl, the alkanoyl moiety having from 2 to 7 carbon atoms, carbamoyloxyphenyl, N-methylcarbamoyloxyphenyl, N-benzylcarbamoyloxyphenyl, N,N-dimethylcarbamoyloxyphenyl, p-mercaptophenyl, aminophenyl, alkanoylaminophenyl, the alkanoyl moiety having from 2 to 5 carbon atoms, carboxymethyleneoxyphenyl or ureidophenyl, or a monoor di-alkali metal salt of said compound.

11. A compound represented by the formula:



wherein R is lower alkyl, straight or branched chain, of from 3 to 6 carbon atoms, hydroxyphenyl, alkanoyloxyphenyl, the alkanoyl moiety having from 2 to 7 carbon atoms, carbamoyloxyphenyl, N-methylcarbamoyloxyphenyl, N-benzylcarbamoyloxyphenyl, N,N-dimethylcarbamoyloxyphenyl, p-mercaptophenyl, aminophenyl, alkanoylaminophenyl, the alkanoyl moiety having from 2 to 5 carbon atoms, carboxymethyleneoxyphenyl, or ureidophenyl, or a mono-or di-alkali metal salt of said compound.

4,032,653

MIX SUITABLE FOR USE IN SEAMS BETWEEN CARBON BLOCKS

M. Benjamin Dell, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 449,592, March 11, 1974. This application Jan. 19, 1976, Ser. No. 650,174

Int. Cl.² C25B *11/12*

U.S. Cl. 204—294 8 Claims

1. A method of using a mix consisting essentially of calcined carbon aggregate, binder in the form of coal tar pitch or petroleum pitch, and only solvents having boiling points of from 150° to 350° C, said solvents consisting essentially of at least one compound selected from the group consisting of aromatic hydrocarbons having only saturated side chains, the solvent being present in an amount sufficient to render the mix capable of being tamped while the mix is at room temperature, said method comprising tamping the mix into the bottom of an electrolytic cell while the mix is at room temperature, and then bringing the cell to operating temperature.

4,032,654

WATER-SOLUBLE, LIQUID CONCENTRATES OF S-METHYL-[(METHYL-CARBAMOYL)OXY]-THIOACETIMIDATE AND METHYL N', N'-DIMETHYL-N-[(METHYL-CARBAMOYL)OXY]-1-THIOOXAMIMIDATE

Claude Corty, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 484,308, June 28, 1974, abandoned. This application Nov. 20, 1975, Ser. No. 633,838

Int. Cl.² A01N *9/00*

U.S. Cl. 424—298 7 Claims

1. An insecticidal and nematocidal composition of matter comprising (a) S-methyl-[(methylcarbamoyl)oxy]-thioacetimidate, and (b) methyl N',N'-dimethyl-N-[(methylcarbamoyl)oxy]-1-thiooxamimidate in a solvent, said solvent selected from solvent systems consisting of methanol/water containing from 0 to 70 weight percent water, acetone/water containing from about 0 to 70 weight percent water, and cyclohexanone/cyclohexanol/-methanol/water containing from about 20–92 weight percent cyclohexanone and cyclohexanol provided at least about 35% of this component is cyclohexanone, about 3–25 weight percent methanol and at least about 5 weight percent water, the ratio of (a) to (b) being 2:1 to about 1:2½, said composition having a pH of about 2.8 to 3.2.

4,032,655

PHENYLGUANIDINES USEFUL AS ANTHELMINTIC AGENTS

Heinrich Kölling, Haan; Herbert Thomas, Wuppertal-Elberfeld; Arno Widdig, Blecher, and Hartmund Wollweber, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

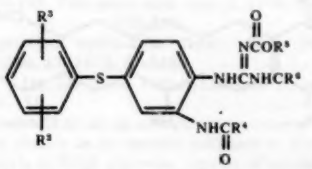
Division of Ser. No. 572,224, April 28, 1975, Pat. No. 3,993,682. This application June 7, 1976, Ser. No. 693,414

Claims priority, application Germany, May 15, 1974, 2423679

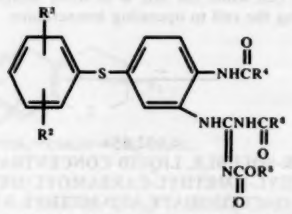
Int. Cl.² A61K *31/27*, *31/155*

U.S. Cl. 424—300 13 Claims

1. A pharmaceutical composition for anthelmintic use in humans and other animals comprising an anthelmintically effective amount of a compound selected from the group consisting of an N-(4-phenylthio-2-amidophenyl)guanidine of the formula:



and an N-(5-phenylthio-2-amidophenyl)guanidine of the formula:



wherein

R_4 is alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkoxy of 1 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, amino, alkylamino of 1 to 6 carbon atoms, or dialkylamino wherein each alkyl group contains 1 to 6 carbon atoms;

R^5 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms or alkynyl of 2 to 6 carbon atoms; and

R^6 is hydrogen, alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkenyloxy of 2 to 6 carbon atoms, alkynyloxy of 2 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, or alkoxyalkoxy of 2 to 12 carbon atoms;

each of R^2 and R^3 independent of the other is hydrogen, halogeno, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkylthio of 1 to 6 carbon atoms, trifluoromethyl, alkanoyl of 1 to 6 carbon atoms, amino, alkanoylamino of 1 to 6 carbon atoms or carbalkoxy of 2 to 7 carbon atoms,

in combination with a pharmaceutically acceptable carrier.

4,032,656

AROMATIC PROSTAGLANDIN DERIVATIVES

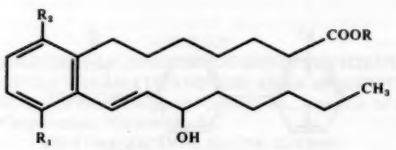
William G. Groves, Blue Bell; Bernard Loev, Broomall, and Carl D. Perchonock, Philadelphia, all of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Nov. 21, 1975, Ser. No. 634,094

Int. Cl.² C07C *69/76*

U.S. Cl. 424—308 **2 Claims**

1. A pharmaceutical composition in dosage unit form having antiprostaglandin activity comprising a chemical compound of the formula:



in which:

R is hydrogen or lower alkyl; and R_1 and R_2 are hydrogen or lower alkoxy of from 1 to 3 carbon atoms;

and a pharmaceutical carrier.

4,032,657

HALOACETANILIDES AS MICROBICIDAL ACTIVE SUBSTANCES

Hans Moser, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

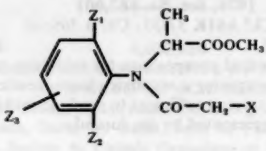
Filed March 27, 1975, Ser. No. 562,741

Claims priority, application Switzerland, Apr. 1, 1974, 4510/74; Aug. 23, 1974, 11521/74; Aug. 23, 1974, 11522/74

Int. Cl.² A01N *9/20*; C07C *101/447*

U.S. Cl. 424—309 **28 Claims**

1. A compound of formula I



(I)

wherein

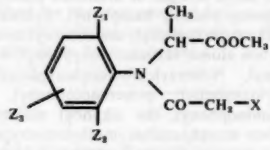
Z_1 represents methyl or chlorine,

Z_2 represents chlorine or bromine,

Z_3 represents hydrogen or C_1–C_3-alkyl, and

X represents fluorine, chlorine, bromine or iodine.

16. A fungicidal composition containing as active substance a fungicidally effective amount of a compound of formula I



(I)

wherein

Z_1 represents methyl or chlorine,

Z_2 represents chlorine or bromine,

Z_3 represents hydrogen or C_1–C_3-alkyl, and

X represents fluorine, chlorine, bromine or iodine, together with a suitable carrier therefor.

4,032,658

ALKANOLAMINE DERIVATIVES

Laszlo Beregi, Boulogne; Pierre Hugon, Rueil-Malmaison; Jacques Duhault, Chatou, and Michelle Boulanger, Marly le Roi, all of France, assignors to Science-Union et Cie, Suresnes, France

Filed Apr. 23, 1975, Ser. No. 570,876

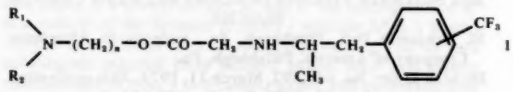
Claims priority, application United Kingdom, Apr. 30, 1974, 18838/74

Int. Cl.² C07C *101/04*

U.S. Cl. 424—309 **6 Claims**

1. A compound selected from the group consisting of:

A. alkanolamine derivatives and their optical isomers of formula I:



(I)

wherein:

n is 2 or 3 and

R_1 and R_2 are each lower-alkyl having 1 to 4 carbon atoms inclusive, and

B. physiologically tolerable acid addition salts thereof.

6. A method of treating a living animal body afflicted with obesity, atheroma, or other metabolic disease requring weight reduction or regulation, comprising the step of administering

to said living animal body an amount of a compound of claim 1 which is effective for such purpose.

4,032,659

METHOD OF VIRAL CHEMOPROPHYLAXIS

Charles Paul Hegarty, Radnor, and Helen C. Pietryk, Havertown, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 808,989, March 20, 1969, abandoned. This application June 26, 1975, Ser. No. 590,536

Int. Cl.² A61K *31/175, 31/22, 31/40*

U.S. Cl. 424—323 10 Claims

1. A method of controlling a virus infection in a host suffering from a virus infection in which the virus is a member of the class consisting of Herpes simplex, Vaccinia, Influenza A (PR8), Influenza A_1 (Ann Arbor), Influenza A_2 (Taiwan), Influenza B (Mass.), Influenza B (Maryland), Mengo, Columbia SK polio, and Neurovaccinio comprising orally administering to the animal host from 250 picograms to 250 micrograms per kilogram of host body weight of a compound is selected from the class consisting of:

A. 2-Butanone, thiosemicarbazone
B. 3-Pentanone, thiosemicarbazone
C. 2-Pentanone, thiosemicarbazone
D. Acetone, thiosemicarbazone
E. Acetoacetic acid, ethylester, thiosemicarbazone
F. Cyclohexanone, thiosemicarbazone
G. Cyclobutanone, thiosemicarbazone
H. 2-Indanone, thiosemicarbazone
I. 2-Indanone, 4-allythiosemicarbazone
J. Cyclopentanone, o-tolylthiosemicarbazone
K. Adamantyl thiosemicarbazide
L. Thiosemicarbazide
M. Methisazone
N. Semicarbazide

and the pharmaceutically acceptable acid addition salts thereof.

4,032,660

ACETOXIME DERIVATIVES AND PROCESS FOR PREPARING THE SAME

Georges Marcel Taillandier; Jean-Louis Alain Benoit-Guyod, both of Grenoble; André Louis Boucherle, Corenc-Montfleury; Pierre Luc Eymard, Fontaine, and Madeleine Broll, Grenoble, all of France, assignors to Labaz, Paris, France

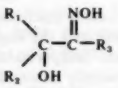
Filed June 5, 1975, Ser. No. 584,176

Claims priority, application France, June 25, 1974, 74.22033

Int. Cl.² A61K *31/15*

U.S. Cl. 424—327 5 Claims

1. A method for treating anxiety and convulsive states of the central nervous system in a subject in need of such treatment comprising administering to the said subject 200 to 1000 milligrams per 60 kilograms of body weight per day of at least one acetoxime derivative of the formula:



wherein R_1, R_2 and R_3, which may be the same or different, each represent a branched-or straight-chain alkyl group having from 1 to 4 carbon atoms or R_1 and R_2, when they are taken together, represent with the carbon atom to which they are attached, a cyclohexyl group.

4,032,661

CYCLIC SULPHOXIDES AND SULPHONES HAVING A PHYSIOLOGICAL COOLING ACTION ON THE HUMAN BODY

David G. Rowsell, Staines, and David J. Spring, Datchet, both of England, assignors to Wilkinson Sword Limited, London, England

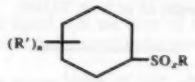
Filed July 20, 1973, Ser. No. 381,096

Claims priority, application United Kingdom, July 20, 1972, 33994/72

Int. Cl.² A61K *31/10*

U.S. Cl. 424—337 2 Claims

1. In a manufactured consumer product for topical application to the human body, comprising a topically administrable carrier, and, as adjuvants in said carrier, i] an antiseptic or perfume or both, and ii] a compound capable of stimulating the cold receptors of the nervous system of the surface tissues of the body when brought into contact therewith by topical application of the said product, the improvement which comprises using as said cold receptor stimulating compound, an effective amount of a cold receptor stimulating sulfoxide or sulfone of the formula:



where

R is C_1–C_5 alkyl;
R′ is C_1–C_5 alkyl;
n is 1 or 2;
the total number of carbon atoms provided by R and all the R′ groups is from 2–12 inclusive; and
x is 1 or 2.

4,032,662

METHOD FOR THE TREATMENT OF CONTACT ALLERGIC DERMATITIS

Idabelle K. Mannear, Montrose, Pa., assignor to Idabelle K. Mannear; Charles H. Mannear, both of Montrose; George W. Kanarr and Ruth A. Kanarr, both of Shavertown, all of, Pa., part interest to each

Filed Jan. 5, 1976, Ser. No. 646,728

Int. Cl.² A61K *31/12*

U.S. Cl. 424—331 7 Claims

1. A method for the treatment of a patient afflicted with contact allergic dermatitis which comprises topically applying acetone to the affected areas of the skin of said patient.

4,032,663

PROCESS FOR USING CELL WALL-LYSING ENZYMES

Reisuke Kobayashi, Shizuoka; Hironari Sato; Kiyoshi Takita, both of Shimizu, and Nobuo Toyama, Miyazaki, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 522,304, Nov. 8, 1974, Pat. No. 3,969,189, which is a continuation of Ser. No. 314,933, Dec. 14, 1972, Pat. No. 3,890,198. This application Apr. 9, 1976, Ser. No. 675,448

Claims priority, application Japan, Dec. 14, 1971, 46-100700; Jan. 27, 1972, 47-9486

Int. Cl.² A23B *7/00*; C12B *1/00*

U.S. Cl. 426—51 9 Claims

5. In a foodstuff or drink containing an enzyme complex incorporated therein in an amount sufficient to dissolve the cells of bacteria or fungi otherwise capable of causing microbial spoilage of said foodstuff or drink, the improvement wherein said enzyme complex consists essentially of a powdery complex enzyme isolated from Pellicularia culture me-

dia, capable of lysing cell walls and having the following characteristics:

a. being active to lyse the cell walls of living cells and dead cells of *Aspergillus niger*, *Penicillium steckii*, *Saccaromyces cerevisiae*, *Candida utilis*, *Candida albicans*, *Candida lipolitica*, *Lentinus edodes*, *Bacillus subtilis*, *Lactobacillus lactis* and *Chlorella*;

b. having cell wall-lysing activities stable in a pH range of 3 to 9, the optimum pH being in the range of 5 to 7;

c. said cell wall-lysing activities being optimal in a temperature range of 30° or 40 °C., but the optimum temperature varying depending on the nature of the microorganisms of which cells are to be lysed;

d. said cell wall-lysing activities being stable in a low temperature range but rapidly inactivated at a temperature of higher than 50° C.;

e. said cell wall-lysing activities being inhibited by the presence of Mn^{++}, Ni^{++} or Zn^{++};

f. exhibiting the enzymatic activities of cellulase and β-1,3-glucanase at an optimum temperature of 40°–50° C. and an optimum pH of 5.0, chitinase at an optimum temperature of about 35° C. and an optimum pH of 4.0–5.5, protease, hemicellulase and amylase; and

g. consisting essentially of component enzymes each having a molecular weight of at least 50,000.

4,032,664

FRIED FORMED CHIP

Verne E. Weiss, Wayzata; Glenn M. Campbell, and Gerald L. Wilson, both of, Minneapolis, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Division of Ser. No. 355,260, April 27, 1973, Pat. No. 3,935,322. This application Jan. 19, 1976, Ser. No. 650,326

Int. Cl.² A23L *1/12*

U.S. Cl. 426—76 **4 Claims**

1. A chip-type snack food product comprising a length of a ribbon including a series of uniformly-shaped interconnected fried chips, each of said interconnected chips having opposed arcuate peripheral edges, and said series of interconnected chips having narrow interconnecting portions spaced along the length of said ribbon.

4,032,665

SIMULATED BONE

Timothy Allen Miller, Ferguson, Mo., and Carlo J. Hansen, Waterloo, Ill., assignors to Ralston Purina Company, St. Louis, Mo.

Division of Ser. No. 395,479, Sept. 10, 1973, which is a continuation-in-part of Ser. No. 174,569, Aug. 24, 1971, abandoned. This application May 15, 1975, Ser. No. 577,811

Int. Cl.² A23G *1/00*

U.S. Cl. 426—104 **3 Claims**

1. A simulated bone containing 5–12% moisture and about 5% but less than 7% fat and having a structural matrix consisting essentially of a matrix of substantially unpuffed, farinaceous and proteinaceous ingredients, said simulated bone having been prepared by drying a dough composition containing 50–75% by weight farinaceous material, a proteinaceous material, 5–15% fat and 15–45% moisture, whereby the simulated bone has a shear value of not less than 250 pounds and a substantially white color which falls within the following range as measured on a Gardner Color Difference Meter using a White color standard Plate No. XL-10

White to Black	70 to 90
Red	−1.0 to 3.0
Yellow	15.0 to 30.0

4,032,666

METHOD OF MANUFACTURING EDIBLE SOY PROTEIN-CONTAINING, DRIED MEAT PRODUCT

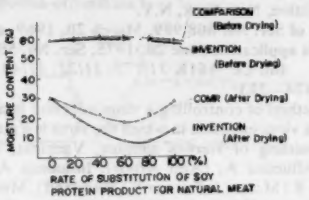
Shizuo Obata, Kashiwara; Yukiomi Yamato, and Hitoshi Taniguchi, both of Osaka, all of Japan, assignors to Fuji Oil Company, Ltd., Japan

Filed Feb. 14, 1975, Ser. No. 550,049

Claims priority, application Japan, Feb. 18, 1974, 49-19731

Int. Cl.² A23B *4/04*

U.S. Cl. 426—242 **7 Claims**



1. A method of manufacturing an edible soy protein-containing, dried meat product, which comprises mixing a fibrous soy protein product of fibril structure having a random orientation, obtained by heating an aqueous slurry of a sufficiently reactive protein material at a temperature of at least 165° F under a pressure of about 50 p.s.i.g. and extruding the heated slurry through an orifice to produce said fibrous product, with a natural meat in an amount such that about 40 to 80% of the total weight of natural meat and soy protein is soy protein heat-treating the mixture of said fiber soy protein product and said natural meat at not less than 60° C for 5 to 30 minutes under atmospheric pressure and drying the heat-treated mixture to a moisture content of not greater than 10% whereby the dried mixture possesses increased swellability and texture when hydrated.

4,032,667

METHOD FOR COATING CONFECTIONERY ARTICLES WITH CHOCOLATE

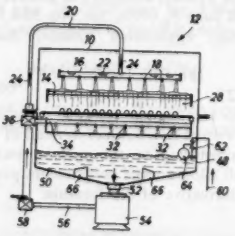
Walter Kreuter, Norderstedt, Germany, assignor to Kreucoha AG, Zug, Switzerland

Continuation of Ser. No. 445,533, Feb. 25, 1974, abandoned. This application May 5, 1976, Ser. No. 683,047

Claims priority, application Germany, Feb. 28, 1973, 2309822

Int. Cl.² A23G *1/00, 3/00*

U.S. Cl. 426—306 **5 Claims**



1. In a method for coating confectionery articles with a tempered chocolate, comprising the steps of feeding a current of precrystallized, molten tempered chocolate onto a veil plate to produce a downwardly descending substantially pressure-free film of molten chocolate under gravitational force, passing the confectionery articles to be coated through said film, collecting unused chocolate and recirculating said unused chocolate to said current, the improvement consisting of pressurizing said current prior to its being fed to said veil plate to an overpressure of at least one atmosphere and subjecting

the current to a brief high shear stress by forcing the current by the aid of said overpressure through at least one nozzle onto said veil plate in said feeding step.

4,032,668

EXPANSION PROCESS FOR THE PRODUCTION OF INSTANT GRITS

Benjamin Bostick Jones, Savannah, Ga.; Richard John Karrasch, Sterrett, and Stephen Wallace Eitel, Birmingham, both of Ala., assignors to The Jim Dandy Company, Birmingham, Ala.

Filed Jan. 30, 1975, Ser. No. 545,754
Int. Cl.² A23L *1/168*
U.S. Cl. 426—449 **4 Claims**

1. A process for treating grits to produce a quickcooking product, which possesses a texture and taste comparable to ordinary cooked grits as well as good rehydration qualities, consisting essentially of:

a. preparing an initial product of grits by reducing said grits to a fine mesh;

b. mixing said initial product with from about 15–40% by weight of water, steam or mixtures thereof;

c. gelatinizing the resulting mixture by heating said mixture under high mechanical pressure in the presence of superheated water at a temperature ranging from 100° to 250° F for a period of time sufficient to completely gelatinize the grits therein without significant dextrinization;

d. releasing the pressure on the mixture to produce an expanded grit product having a moisture content of about 15 to 40%;

e. drying the expanded grit produced at a temperature from about 160° to about 200° F to a final moisture content of less than about 12%; and

f. comminuting the expanded grit product to a size finer than 12 mesh whereby a quick-cooking product is obtained.

4,032,669

CHEESE PRODUCT AND PROCESS FOR PRODUCTION

Joseph Jerome Peters, Timber Trails; Antonio Tong Villanueva, Marysville, and Robert Samuel Keller, Columbus, all of Ohio, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Continuation-in-part of Ser. No. 454,416, March 25, 1974, abandoned. This application Dec. 20, 1974, Ser. No. 534,722
Int. Cl.² A23C *19/12*
U.S. Cl. 426—573 **10 Claims**

1. An edible product in the form of granules and comprising natural cheese dispersed within an aqueous gel matrix of Xanthomonas colloid and locust bean gum, said edible product being stabilized with from 5 to 30% by weight of said natural cheese of a firming agent selected from the group consisting of casein and an edible caseinate salt, said edible product having the firm, physical consistency of said natural cheese.

4,032,670

VARIABLE COATING FEED

Walter B. Warning, Sr., Chicago, and Walter B. Warning, Jr., Schaumburg, both of Ill., assignors to Airprint Systems, Inc., Elk Grove Village, Ill.

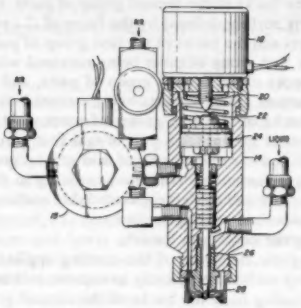
Division of Ser. No. 562,679, March 27, 1975. This application July 30, 1976, Ser. No. 710,285
Int. Cl.² B05D *1/04*
U.S. Cl. 427—8 **3 Claims**

1. A method of controlling the operation of a device for applying liquid in a predetermined pattern to a moving surface, comprising the steps of

mounting a liquid applying device in a fixed position along the path of travel of said surface and controlling liquid feed through a discharge orifice of said device by a needle valve operatively associated with a motor driven adjustable stop spaced from said valve,

feeding liquid from said device to said surface as it moves thereby,

generating a signal having a value related to the speed at which said surface passes said applying device and



wherein said signal is in the form of an electric pulse for each predetermined incremental movement of surface, and

controlling the motor drive of said adjustable stop in response to the value of said signal to thereby vary the rate at which liquid is fed from said liquid applying device.

4,032,671

METHOD OF FORMING ART PRODUCT

Robert W. Hyde, Rte. 1, Box 236, Crystal River, Fla. 32629

Filed June 28, 1976, Ser. No. 700,165
Int. Cl.² B05D *1/36, 1/38, 3/14, 5/06*
U.S. Cl. 427—14 **18 Claims**

1. A method of producing a display item comprising the steps of:

a. forming a plate for said display item from a material capable of bearing an electrostatic charge;

b. applying a liquid electroresponsive pigment bearing material to a surface of said plate;

c. placing an electrostatic charge on said plate;

d. allowing said material to disperse on said surface in response to said charge; and

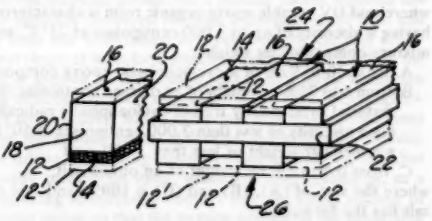
e. drying said dispersed material on said plate.

4,032,672

METHOD FOR COATING PARTS

Harold E. McCormick, Ballwin, Mo., assignor to Ramsey Corporation, St. Louis, Mo.

Filed Aug. 5, 1975, Ser. No. 602,110
Int. Cl.² B05D *3/12, 1/08*
U.S. Cl. 427—34 **12 Claims**



1. A method of coating respective faces of a plurality of parts having a face, a back and sides wherein said sides are

configured for assembly in abutting side-by-side relationship which comprises the steps of:

assembling the parts in abutting side-by-side relationship with a first group of parts having their faces facing in one direction, and a second group of parts having their faces facing in the opposite direction so as to form a first coating surface defined by the faces of the first group of parts and the backs of the second group of parts, and a second coating surface defined by the faces of the second group of parts and the backs of the first group of parts, the faces of the first group of parts being recessed with respect to the backs of the second group of parts, and the faces of the second group of parts being recessed wth respect to the backs of the first group of parts, said parts being assembled so that each part of said first group of parts is succeeded in order by one of said second group of parts,

applying a hardenable continuous coating to the first coating surface and applying a hardenable continuous coating to the second coating surface,

allowing the coating to harden,

reducing the thickness of the coating applied to the first coating surface sufficiently to remove substantially all of the coating from the backs of the second group of parts and expose the backs thereof while leaving a residual coating on the recessed faces of the first group of parts, and

reducing the thickness of the coating on the second coating surface sufficiently to remove substantially all of the coating from the backs of the first group of parts and expose the backs thereof while leaving a residual coating on the recessed faces of the second group of parts.

4,032,673

METHOD FOR APPLYING AN ORGANIC COATING ONTO AN INORGANIC COATED STEEL SHEET

Siegfried H. Schroeter, Schenectady, N.Y.; Jon VanWinkle, Dalton, and Carroll B. French, Lenox, both of Mass., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 444,859, Feb. 22, 1974, Pat. No. 3,924,022. This application Sept. 19, 1975, Ser. No. 614,793

Int. Cl.² B05D *3/06*

U.S. Cl. 427—54 **8 Claims**

1. A substantially pollution-free method for uniformally improving the surface resistivity of oriented steel strip having an inorganic material as a surface insulating coating to produce an oriented steel strip-inorganic coating-organic resin composite capable of providing an average Franklin test reading of from 0.1 to 0 amperes at a pressure of up to 300 psi, which comprises,

1. **treating the oriented steel strip with a UV curable solventless epoxy organic resin to a thickness of up to** 0.2 mil, and
2. **passing the treated oriented steel strip through an irradiation curing zone at a rate of up to** 600 feet per minute, using an irradiation flux sufficient to effect the cure of the solventless epoxy organic resin to an organic resin hardness capable of being tested by the above-described Franklin test,

where said UV curable epoxy organic resin is characterized by having a viscosity of up to 3,000 centipoises at 25° C, and is a mixture comprising by weight

A. from 30 to 99% of a cycloaliphatic epoxy compound,

B. from 1 to 70% by weight of an oxirane containing organic material substantially free of cycloaliphatic radicals having a viscosity of less than 3,000 centipoises at 50° C and a molecular weight of less than 1,000, and

C. from 0.5 to 5% by weight of an onium salt,

where the sum of (A), (B) and (C) is **100%**, and said onium salt has the formula,

$$[Y]^{j+}[MD_k]^{-(k-n)}$$

where M is a metal or metalloid, and D is a halogen radical, Y is a cation selected from the class consisting of

$$[(R)_a(R^1)_b Q]^+ [(R)_c(R^2)_d (R^3)_e X]^+ [(R)_f(R^4)_g (R^5)_h X]^+$$

where R is a monovalent aromatic organic radical, R^1 is a divalent aromatic organic radical, R^2 is a monovalent organic aliphatic radical selected from alkyl, cycloalkyl and substituted alkyl, R^3 is a polyvalent organic radical forming a heterocyclic or fused ring structure selected from aliphatic radicals and aromatic radicals, R^4 is a monovalent organic aliphatic radical selected from alkyl, alkoxy, cycloalkyl and substituted derivatives thereof, R^5 is a polyvalent organic radical forming an aromatic heterocyclic or fused ring structure with Z, Q is a halogen radical, X is a Group VI*a* element selected from sulfur, selenium and tellurium, Z is a Group V*a* element selected from N, P, As, Sb and Bi, a is a whole number equal to 0 or 2, b is a whole number equal to 0 or 1, the sum of $a + b$ is equal to 2 or the valence of Q, c is a whole number equal to 0 or 3, d is a whole number equal to 0 to 2 inclusive, e is a whole number equal to 0 or 1, where the sum of $c + d + e$ is a value equal to 3 or the valence of X, f is a whole number equal to 0 to 4 inclusive, g is a whole number equal to 0 to 2 inclusive, and h is a whole number equal to 0 to 2 inclusive and the sum of $f + g + h$ is a value equal *to* 4 or the valence of Z,

$j = k - n$

n = valence of M and is an integer equal to 2 to 7 inclusive, and

k is >n and is an integer having a value up to 8,

where said irradiation curable solventless epoxy organic resin is capable of providing with 10C hydrocarbon oil, an interfacial tension reading of from 30–49/cm in accordance with ASTM D971-50 (1970).

4,032,674

MAGNETIC MEMORY STRUCTURE AND METHOD OF MAKING THE SAME

Masaya Hirabayashi, Kyoto, and Hiromasa Enjo, Gamo, both of Japan, assignors to Kyoto Ceramic Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 265,457, June 30, 1972, abandoned. This application Jan. 14, 1975, Ser. No. 540,968

Int. Cl.² B05D *5/12*

U.S. Cl. 427—130 **13 Claims**

1. A method of manufacturing a magnetic memory structure characterized in that the method comprises the steps of applying a mixed aqueous solution of the respective water-soluble salts of iron and cobalt to a substrate of alumina ceramics, drying said solution and heating said solution to between 200 to 500° C to thermally decompose the respective salts in the solution thereby to deprive the solution of its water so as to form a film of oxides of iron and cobalt on said substrate, said mixed aqueous solution being mixed at a stoichiometrical rate so that said film on said substrate is represented by a general formula $Co_{(1-x)}Fe_{(2+x)}O_4$ (wherein $-0.2 \leqq x \leqq 0.3$), sintering said film at temperatures approximately below 1300° C to subject said oxides to thermochemical reactions thereby forming a solid cobalt-based spinel type ferrite film on said substrate.

4,032,675

METHOD FOR PRODUCING COATED ELECTRICAL STEEL SHEETS HAVING EXCELLENT PUNCHABILITY, WELDABILITY, ELECTRICAL INSULATION AND HEAT RESISTANCE

Toshio Irie, Chiba; Toshikuni Tanda, Akashi; Tomoyuki Ichi, Ashiya, and Toshio Sadayori, Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed Oct. 14, 1975, Ser. No. 621,740

Claims priority, application Japan, Oct. 15, 1974, 49-117646

Int. Cl.[2] B05D *3/02, 5/12, 7/14*

U.S. Cl. 427—126 13 Claims

1. A method for producing coated electrical steel sheets having excellent punchability, weldability and insulation characteristics comprising applying on an electrical steel sheet, a treating dispersion obtained by compounding:

a. a resin emulsion which separates agglomerated particles having an average particle diameter of 3–40 microns when compounded in an aqueous solution containing chromic acid;

b. a resin compatible with an aqueous solution containing chromic acid; and

c. an aqueous solution containing chromic acid so that the total amount of non volatile matter of both the resins is 5–150 parts by weight per one hundred parts of chromic acid by weight expressed as CrO_3 with the amount of the resin emulsion being at least one part by weight of the total weight amount of the resin and resin emulsion and said resin emulsion provides at least 5% by weight of the total amount of the non volatile matter of the resin and the resin emulsion; and baking the thus treated steel sheets.

4,032,676

N-POLYHYDROXYALKYL-AMINO ACIDS, THEIR MANUFACTURE AND SKIN TREATING AGENTS CONTAINING THE SAME

Arnold Heins, Hilden; Hinrich Moller, Dusseldorf-Benrath, and Rainer Osberghaus, Dusseldorf-Urdenbach, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Dec. 20, 1974, Ser. No. 534,805

Claims priority, application Germany, Dec. 24, 1973, 2364525

Int. Cl.[2] A61K *31/415*

U.S. Cl. 424—273 30 Claims

1. A cosmetic moisturing composition for the care and protection of the skin of warm-blooded animals consisting essentially of an emulsion adjusted to a pH between 5 and 7 containing an emulsifier, from 2% to 20% by weight of at least one N-polyhydroxyalkyl-amino acid compound selected from the group consisting of (1) acids of the formula

$$HOOC-R_1-NH-\underset{\displaystyle (CHOH)_n-H}{\underset{|}{CH}}-(CHOH)_m-R_2$$

wherein R_1 is $-CHR_3-$, wherein R_3 is a member selected from the group consisting of hydrogen, alkyl having 1 to 6 carbon atoms, hydroxyalkyl having 1 to 6 carbon atoms, mercaptoalkyl having 1 to 6 carbon atoms, methylthioalkyl having 1 to 6 carbon atoms in the alkyl, aminoalkyl having 1 to 6 carbon atoms, polyhydroxyalkylaminoalkyl having the formula

$$-(CH_2)_p-NH-\underset{\displaystyle (CHOH)_n-H}{\underset{|}{CH}}-(CHOH)_m-R_2$$

where p is an integer from 1 to 6, and m, n and R_2 have the following assigned values, carboxyalkyl having 1 to 6 carbon atoms in the alkyl, guanidinoalkyl having 1 to 6 carbon atoms in the alkyl, polyhydroxyalkylguanidinoalkyl having the formula

$$-(CH_2)_p-NH-\overset{\displaystyle NH}{\overset{\|}{C}}-NH-\underset{\displaystyle (CHOH)_n-H}{\underset{|}{CH}}-(CHOH)_m-R_2$$

where p has the above-assigned values and m, n and R_2 have the following assigned values, ureidoalkyl having 1 to 6 carbon atoms in the alkyl and glyoxalinoalkyl having 1 to 6 carbon atoms in the alkyl, R_2 is a member selected from the group consisting of $-CH_2OH$ and $-COOH$, m is an integer 3 or 4, and n is 0, or, when m is 3 and R_2 is $-CH_2OH$, n is 1, (2) alkali metal salts thereof, (3) ammonium salts thereof and (4) lower alkylammonium and lower alkylol ammonium salts thereof, and the remainder inert cosmetic excipients, said emulsion being selected from the group consisting of oil-in-water emulsions and water-in-oil emulsions.

4,032,677

METHOD OF FORMING A COATING OF A RUBBER OR A SYNTHETIC RESIN HAVING AN EVEN THICKNESS ON THE EXTERNAL SURFACE OF A TUBULAR TEXTILE JACKET

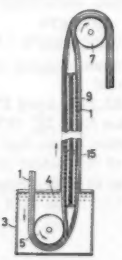
Eiji Ichioka, and Yurifumi Harada, both of Osaka, Japan, assignors to Ashimori Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 12, 1973, Ser. No. 369,290

Claims priority, application Japan, June 12, 1972, 47-58446

Int. Cl.[2] B05D *1/18*

U.S. Cl. 427—358 23 Claims

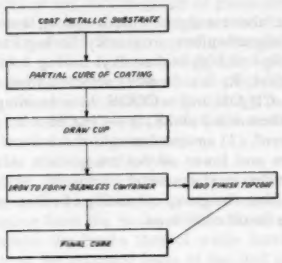


1. In a method of forming a coating having a uniform thickness on the external surface of a tubular jacket wherein the tubular jacket is conveyed through a coating liquid bath and drying zone and maintained in a substantially circular cross-sectional shape at least for a distance from the point where the coating is applied to the tubular jacket to a point where the coating attached to the external surface of the jacket solidifies, the improvement which comprises inserting into the inner space of the tubular jacket a flexible, self-rotatable, endless, double tubing expanding member, said expanding member continually turning on itself, inside out and outside in, as a result of being in frictional contact with the inside surface of the tubular jacket so that the outside surface of the expanding member is moving in the same direction as the inside surface of the tubular jacket and the inside surface of the expanding member is moving in the opposite direction to its outside surface thereof.

4,032,678
COATED SHEET METAL AND METHOD OF FORMING PRODUCTS THEREFROM

Guido A. Perfetti, and Henry Darlington, both of Bethlehem, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Continuation-in-part of Ser. No. 505,302, Sept. 12, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,462
Int. Cl.² B22D 51/26
U.S. Cl. 427—388 A 15 Claims



1. In a process for drawing and ironing a coated metallic sheet into seamless containers, the method which consists essentially of the steps of:

a. providing a metallic sheet,

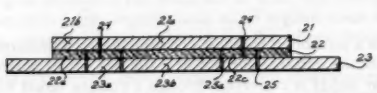
b. applying a coating of thermosetting organic material to the surface of the metallic sheet, and

c. subjecting the coating of thermosetting organic material to a temperature for a time to effect a cure of the coating in the range of between about 1% and about 75% MEK insoluble residue, which cure provides a bond between the coating and the metallic sheet and a coating with sufficient extensibility to draw and iron the coated metallic sheet into a seamless container without further treatment of the coating.

4,032,679
STICKER

Katumi Aoyagi, Chofu, Japan, assignor to Shiro Kojima, Tokyo, Japan, a part interest

Division of Ser. No. 355,211, April 27, 1973, Pat. No. 3,925,585. This application Nov. 22, 1974, Ser. No. 526,401
Claims priority, application Japan, Apr. 27, 1972, 47-42528
The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.
Int. Cl.² B32B 3/16
U.S. Cl. 428—42 4 Claims



1. A sticker, comprising:

a sheet having a layer of pressure sensitive adhesive disposed thereon and substantially covering a surface thereof, the sheet having a dividing line defining an inner sheet clipping portion and, around the same, an annular portion of the sheet, and enabling dividing the sheet into these portions pursuant to application of an imprint to the sheet which after said dividing correlates the inner and annular portions; and

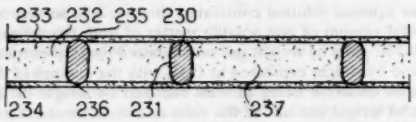
a detachable release paper temporarily attached to the layer of adhesive and having parting lines surrounding one another to define and enable mutual separation of inner, intermediate and outer parts of the release paper, the intermediate part underlying the dividing line of the sheet,

thereby facilitating separate application of the inner and annular portions to different articles.

4,032,680
CONSTRUCTION MEMBER

Francois Allard, 34 Avenue Leclerc, 59 Douai, France

Continuation of Ser. No. 373,775, June 26, 1973, which is a continuation-in-part of Ser. No. 163,297, July 16, 1971, Pat. No. 3,791,912. This application July 14, 1975, Ser. No. 595,689
Claims priority, application France, July 22, 1970, 70.27047; Jan. 15, 1971, 71.01277; June 27, 1972, 72.23232
Int. Cl.² B32B 3/26
U.S. Cl. 428—119 12 Claims

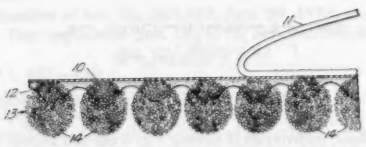


1. A flat construction element comprising a core of expanded resin foam material having opposite surfaces, a plurality of parallel metallic members regularly distributed in said core, said members each having a height equal to the thickness of said core, a cover layer on each of the surfaces of said core, each said cover layer being constituted of hardened resin in contact with the associated surface of the core and with said metallic members along the external surface thereof, and a layer of hardened resin interposed between the metallic members and said core.

4,032,681
POROUS REFLECTIVE FABRIC

Nelson Jonnes, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 21, 1975, Ser. No. 569,795
Int. Cl.² B32B 7/00
U.S. Cl. 428—253 14 Claims



1. A porous reflective fabric comprising a resiliently stretchable base fabric and an originally continuous vapor-deposited reflective layer less than about one micrometer thick adhered to the base fabric by a layer of adhesive material and leaving the base fabric with sufficient drapability that a sample supported by a person's forefinger will collapse around his fist; said reflective and adhesive layers having an extensive network of minute fractures communicating with interstices in the base fabric whereby said reflective fabric has a porosity sufficient for extended comfortable wearing of a garment that incorporates the fabric.

4,032,682
MAGNETIC RECORDING ELEMENT AND METHOD FOR MAKING SAME

Claude Jeanine Masson, Paris, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 17, 1975, Ser. No. 596,924
Claims priority, application France, July 30, 1974, 74.26355
Int. Cl.² B05D 5/12; B32B 5/16
U.S. Cl. 428—309 12 Claims

1. A magnetic recording element comprising a support coated on one of its surfaces with at least one magnetic layer comprised of a dispersion of magnetizable particles in resinous binder, said binder comprising a single copolymer of vinyl acetate and vinyl chloride, or a mixture of copolymers of vinyl acetate and vinyl chloride of different compositions, or a mixture of a copolymer of vinyl acetate and vinyl chloride with polyvinyl butyral, or a mixture of polyvinylidene chloride-acrylonitrile copolymer with a copolymer of vinyl acetate and vinyl chloride, or at least one cellulose acetobutyrate composition, or a mixture of copolymer of vinyl acetate and vinyl chloride with a copolymer of vinyl chloride and methyl acrylate; said at least one magnetic layer having a porous structure and comprising fine particles of said binder with interstices included between particles, and said elements exhibiting a transverse incurvature of not more than 4 mm across a 35 mm wide strip thereof.

3. A method for making a magnetic recording element comprising:

preparing a dispersion of magnetizable particles in a solution of resinous binder consisting essentially of at least one copolymer of vinyl acetate and vinyl chloride, or at least one cellulose acetobutyrate composition, or a mixture of a copolymer of vinyl acetate and vinyl chloride with either polyvinyl butyral or with a copolymer of vinylidene chloride and acrylonitrile or with a copolymer of vinyl chloride and methyl acrylate, dissolved in a solvent system comprising butanol and either methylene chloride, acetone, or methyl ethyl ketone;

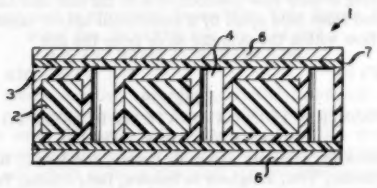
coating said dispersion on a substrate; and

causing said solvents to evaporate, leaving a magnetic layer having a porous structure on said substrate.

4,032,683
STRUCTURAL MEMBER AND METHOD OF MAKING SAME

Harold D. Coale, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 27, 1976, Ser. No. 727,318
Int. Cl.² B32B 3/26
U.S. Cl. 428—315 14 Claims



1. A heat resistant article of reinforced plastic comprising:

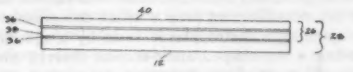
a. a structural member comprised of cellular poly(phenylene sulfide) and at least one reinforcing filler with said poly(phenylene sulfide) being at least partially cured and is in an amount of at least about 20 weight percent of the member; and

b. a coating on said member, said coating is at least partially comprised of poly (phenylene sulfide) and is at least partially cured.

4,032,684
LAMINATED BACKING STRUCTURE FOR COMPOSITE LITHOGRAPHIC PLATE

Richard Harry Dunnington; Carl Michael Viglianco, and Wilkens, George Rudolph, all of Winston-Salem, N.C., assignors to RJR Archer, Inc., Winston-Salem, N.C.

Filed Sept. 10, 1976, Ser. No. 722,246
Int. Cl.² B32B 27/08, 27/10
U.S. Cl. 428—332 4 Claims



1. A laminated backing structure for a composite lithographic plate comprising a metal sheet and a backing structure which laminated backing structure comprises:

a. bonding layer consisting essentially of a thermoplastic resin bondable to the back of a lithographic grade metal sheet under the influence of heat and pressure;

b. an intermediate filler layer of a normally solid flexible organic polymeric material, which layer is resistant to water, ink and grease to provide a selected thickness to said backing structure;

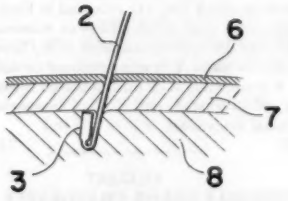
c. an outer interleaving layer of a thermoplastic or thermosetting organic polymer having a smooth non-suff surface which does not adhere to the metal surface of a metal surfaced lithographic plate under ambient conditions, and which does not become tacky under the conditions necessary to bond the bonding layer (a) to a lithographic metal sheet;

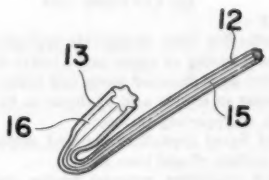
said layers being bonded together to form a coherent laminated structure.

4,032,685
ARTIFICIAL HAIR

Shiro Yamada, No. 31-8, Koboyama, Kobo-cho, Chiryu, Aichi, Japan

Filed June 3, 1976, Ser. No. 692,305
Claims priority, application Japan, Aug. 1, 1975, 50-105798[U]
Int. Cl.² A41G 5/00; D01D 5/12
U.S. Cl. 428—399 9 Claims





1. An artificial hair having a hair portion of diameter substantially the same as that of natural hair constituted essen-

tially of a monofilament of thermoplastic resin having a corollaceous cross-section, and an elongated root portion integrally formed at one end of the monofilament and having a corollaceous cross-section larger than that of said hair portion, said elongated root portion being of length to render said root portion totally implantable in the skin while aligned largely perpendicular to the plane of the skin.

8. A method of preparing artificial hair constituted essentially of a monofilament of thermoplastic resin having a corollaceous cross-section and a root formed at one end of the monofilament having a corollaceous cross-section larger than that of the monofilament proper which comprising:

melt-spinning a thermoplastic resin by a spinning nozzle having a star-shaped cross-section thereby obtaining a monofilament of corollaceous cross-section,

drawing strongly said monofilament in a drawing process, cutting said drawn monofilament to a suitable length and heating instantaneously one end of said cut piece of monofilament at a softening temperature of said plastics thereby obtaining the root having a corollaceous cross-section with approximately the same diameter as that of the undrawn monofilament.

4,032,686

ARTICLES COATED WITH A CURED COMPOSITION OF HYDROXY(POLYALKYLENECARBONYLOXY)ALKYLENEOXAZOLIDINE AND A POLYISOCYANATE

William D. Emmons, Huntingdon Valley, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 569,739, April 21, 1975, which is a division of Ser. No. 425,007, Dec. 14, 1973, Pat. No. 3,912,691. This application Oct. 7, 1976, Ser. No. 730,568

Int. Cl.² C08G *18/34, 18/38, 18/46*

U.S. Cl. 428—425 **5 Claims**

1. An article of manufacture comprising a substrate having thereon a coating of a cured composition of an oxazolidine of the formula:

wherein R′ is hydrogen, mononuclear aryl, aralkyl or alkyl; R² is hydrogen or alkyl or R′ and R² are joined together with the carbon atom to which they are attached to form cycloalkyl; R³ is hydrogen, alkyl, cycloalkyl, alkoxy or mononuclear aryl; R′, R² and R³ may be substituted with halo, lower alkoxy, hydroxy, amino or nitro; Y is unsubstituted or substituted lower alkylene; X is substituted or unsubstituted lower alkylene; *n* is an integer of at least 3, and *z* is an integer of 1–50 and a polyfunctional isocyanate.

4,032,687

TRANSFERABLE COLOR CHANGEABLE APPLIQUE

James R. Hornsby, Jr., Orlando, Fla., assignor to Funstuf, Inc., Orlando, Fla.

Filed Dec. 12, 1975, Ser. No. 640,184

Int. Cl.² C09K *3/34*

U.S. Cl. 428—1 **1 Claim**

1. A transferable color changeable applique comprising:

a base sheet having an upper and a lower surface;

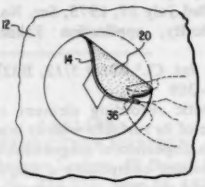
an adhesive layer disposed along said lower surface of said base sheet to enable said applique to be removably affixed to a supporting surface;

a layer of liquid crystalline material disposed along said upper surface of said base sheet;

said liquid crystalline material having characteristics of selective light scattering to exhibit color changes in response to temperature changes; and

indicia means disposed adjacent to and in contact with said liquid crystalline layer and surrounded by said liquid crystalline material;

a transparent layer disposed upon said liquid crystalline



material to allow visual observation of the color changes in said liquid crystalline layer; and

a removable backing sheet removably attached to said adhesive layer.

4,032,688

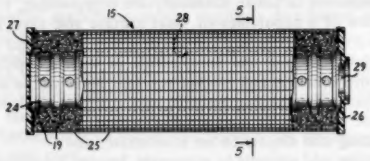
SEAMLESS TUBULAR NONWOVEN WEBS AND FILTERS THEREOF

David B. Pall, Roslyn Estates, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Division of Ser. No. 393,688, Aug. 31, 1973, Pat. No. 3,933,557. This application May 12, 1975, Ser. No. 576,502

Int. Cl.² B01D *29/10*

U.S. Cl. 428—36 **8 Claims**



1. A spirally wound tubular filter element comprising a seamless tubular nonwoven web comprising a generally spirally wound flexible layer of unbonded attenuated randomly-oriented heterogeneously intertwined spun fibers substantially all of which are less than 10 μ in diameter and inn discrete lengths, the layer having an open area of at least 70%, and being held together solely because of the randomly oriented heterogeneous intertwining of the spun fibers, the web being wound spirally on a longitudinally slotted tubular core, the inner end of the interior of the spirally wound flattened cylinder being in fluid flow connection with the slot, and having its opposed sides held apart by a foraminous spacer member for fluid flow within the cylinder to or from the slot.

4,032,689

CONSTRUCTION LAMINATE OF PLASTIC FOAM BETWEEN PAPER SHEETS

Frederick M. Johnson; James R. Brown, and Rex L. Reitz, all of Austin, Tex., assignors to Insulex, Inc., Austin, Tex.

Continuation-in-part of Ser. No. 528,040, Nov. 29, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 621,668

Int. Cl.² B32B *5/18, 3/16;* B63B *5/24;* E04C *5/07*

U.S. Cl. 428—55 **12 Claims**

1. A construction element comprising:

a first face layer of settable resin impregnated glass fiber cloth;

an intermediate stiffening member bonded to said first face layer comprising a laminate of:

a. a flexible top sheet;

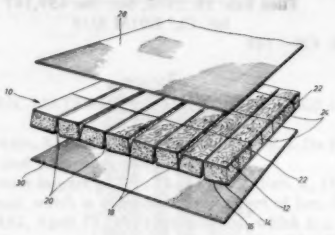
b. an intermediate foam layer bonded to said top sheet; and,

c. a flexible bottom sheet bonded to said intermediate foam layer on the side opposite said top sheet; said laminate having:

i. a first series of spaced slits extending through said top sheet and intermediate foam layer but not through said bottom sheet;

ii. a second series of spaced slits parallel to said first series of spaced slits and extending through said bottom sheet and intermediate form layer but not through said top sheet;

iii. a third series of spaced slits perpendicular to said first and second series of spaced slits, said third series



of spaced slits extending through said top sheet and intermediate foam layer but not through said bottom sheet; and,

iv. a fourth series of spaced slits parallel to said third series of spaced slits and extending through said bottom sheet and intermediate foam layer but not through said top sheet;

said fourth series of spaced slits being offset from said third series of spaced slits; and,

a second face layer of settable resin impregnated glass fiber cloth bonded to said intermediate stiffening member;

said settable resins being in the set state.

4,032,690

THERMOSENSITIVE RECORDING MATERIAL

Isao Kohmura, Nagaokakyo; Yukio Tahara, Takasago; Kiyoshi Futaki, and Hiroshi Tange, both of Nagaokakyo, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Jan. 24, 1975, Ser. No. 544,007

Int. Cl.² B41M *5/18*; B32B *9/06*

U.S. Cl. 428—263 **19 Claims**

1. A thermosensitive recording material composed of a coating composition applied as a single layer on a paper, synthetic resin film or textile cloth support, which coating composition comprises (a) a chromogenic compound, (b) an organic acid which melts or vaporizes at room temperature or higher and reacts with the chromogenic compound to develop color, (c) a water-soluble binder containing a carboxyl group and having a softening point of 200° C. or higher, (d) an infusible filler, (e) a metal salt of a higher fatty acid, and (f) a wax, the weight ratio of (a) to (b) being from 1/1 to 1/20, the amount of (c) being 15 to 50% by weight based on the total solids content of the composition, the amount of (d) being 30 to 300% by weight based on the total weight of (a) and (b), the total amount of (e) and (f) being 10 to 200% by weight based on the total amount of (a) and (b), the weight ratio of (e) to (f) being from 1/10 to 10/1, said recording material having a Bekk surface smoothness of 100 to 500 seconds.

4,032,691

RECORDING MATERIAL

Keishirō Kido; Satoru Honjo, and Masamichi Sato, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 21, 1975, Ser. No. 560,770

Claims priority, application Japan, Mar. 22, 1974, 49-32338

Int. Cl.² B32B *3/26*

U.S. Cl. 428—304 **3 Claims**

1. A recording material which comprises a support having thereon a highly thermally insulating porous resin layer and a metal, dye or synthetic resin which is thermally deformed, foams, colors, discolors, sublimes, evaporates, or becomes transparent, translucent or opaque when exposed to radiation having a high energy density.

4,032,692

PROCESS FOR ADHESIVE BONDING AND COATING

Hans-Walter Birnkraut, Oberhausen, and Werner Kluy, Bochum-Stiepel, both of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Division of Ser. No. 487,182, July 10, 1974, Pat. No. 3,971,690. This application Jan. 14, 1976, Ser. No. 649,154

Claims priority, application Germany, Jan. 10, 1974, 2400978

Int. Cl.² B32B *17/10*; B05D *5/10*

U.S. Cl. 428—442 **6 Claims**

1. A process for coating a material which consists essentially of applying to said material a laminar terpolymer comprising about 70 to 90 parts by weight of ethylene, about 0.5 to 10 parts by weight of an ethylenically unsaturated carboxylic acid amide, there being only hydrogen on the amide nitrogen; and about 0.5 to 20 parts by weight of an ethylenically unsaturated carboxylic acid ester, the sum of said parts by weight being about 100; and heating the terpolymer to a temperature sufficient to cause it to melt, thereby bonding said terpolymer to said material.

6. A process for coating a material which consists essentially of applying to said material a molten terpolymer comprising about 70 to 90 parts by weight of ethylene, about 0.5 to 10 parts by weight of an ethylenically unsaturated carboxylic acid amide, there being only hydrogen on the amide nitrogen, and about 0.5 to 20 parts by weight of an ethylenically unsaturated carboxylic acid ester, the sum of said parts by weight being about 100.

4,032,693

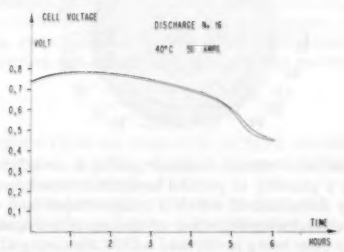
PROCEDURE TO STABILIZE AN IRON AIR BATTERY

Olle Birger Lindstrom, Taby, Sweden, assignor to AB Olle Lindstrom, Taby, Sweden

Filed Aug. 27, 1976, Ser. No. 718,326

Int. Cl.² H01M *8/18*

U.S. Cl. 429—17 **10 Claims**



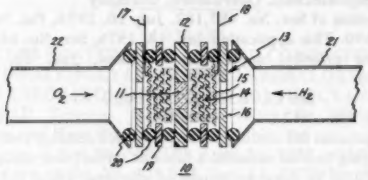
1. In a process for stabilizing an iron-air battery, which battery comprises one or more cells including a positive electrode which contains at least one of the metals cobalt, nickel,

and silver for the reduction of oxygen during discharge and development of oxygen during charge, an alkaline electrolyte, and a negative electrode which contains electrochemically active iron, the process including the step of adding a sulphur-containing -containing compound to the electrolyte, the improvement comprising the step of adding sulphur-containing compound which forms free sulfide ions in said electrolyte, said compound being added in an amount sufficient to yield at least about 10 and up to about 1,000 parts per million by of sulphur in said compound per million parts by weight of active iron material.

4,032,694
FUEL CELL WITH HYDRONIUM BETA-ALUMINA ELECTROLYTE

Robert R. Dubin, Ballston Lake, and Walter L. Roth, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 26, 1976, Ser. No. 717,896
Int. Cl.² H01M 8/10
U.S. Cl. 429—33 **4 Claims**

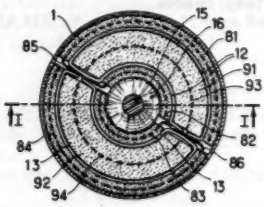


1. A gaseous fuel cell comprising a solid doped hydronium beta-alumina electrolyte which is positioned between and in direct electrical contact with a pair of gas permeable, electronically conductive electrodes, and means for supplying a hydrogen containing fuel gas containing water vapor to one of said electrodes and means for supplying an oxygen oxidant gas to the other end of said electrodes.

4,032,695
CYLINDRICAL ELECTRIC CELL

Jean Coibion, Tresses, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville, France

Filed June 9, 1976, Ser. No. 694,438
Claims priority, application France, June 30, 1975, 75.20496
Int. Cl.² H01M 4/00
U.S. Cl. 429—94 **10 Claims**

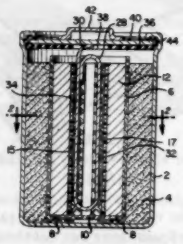


1. A cylindrical electric cell comprising a metallic casing containing a plurality of parallel connected concavo-convex elementary units each of which is trough-shaped and dimensioned to extend over a portion of the arc of a cylinder, the elementary units being juxtaposed within the casing to define a substantially complete cylinder, terminals for said cell, electrical connections between electrodes of the elementary units and the terminals of the cell, each elementary unit comprising a pair of relatively thin negative electrode parts, separator material and a relatively thick, trough-shaped, positive electrode, said positive electrode being tightly sandwiched in the radial direction with interleaved separator material between inner and outer relatively thin, trough-shaped, negative electrode parts of said pair, said parts being electrically interconnected, and means for expanding said units radially outwardly toward said casing.

4,032,696
DISCRETE ANODE BODIES FOR USE IN VARIOUS CYLINDRICAL CELL SYSTEMS

Lewis Frederick Urry, Columbia Station, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Feb. 18, 1976, Ser. No. 659,167
Int. Cl.² H01M 6/14
U.S. Cl. 429—101 **8 Claims**

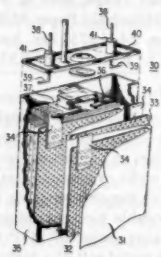


1. An electrochemical cell comprising a container; a cathode collector disposed within said container; a porous separator disposed within and in surface contact with said cathode collector; an anode in the form of at least two discrete bodies disposed within said separator; means for biasing said anode bodies radially outward against said separator which in turn contacts the cathode collector; and a liquid active reducible cathode-electrolyte disposed within said container.

4,032,697
METHODS OF PRODUCING ELECTRODES FOR ALKALINE BATTERIES

Richard Lawrence Beauchamp, Basking Ridge; Dean William Maurer, Berkeley Heights, and Thomas Denis O'Sullivan, Summit, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 471,674, May 20, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 630,031
Int. Cl.² H01M 4/26
U.S. Cl. 429—222 **13 Claims**



1. A process for the fabrication of cadmium electrodes for batteries in which the cadmium electrodes are made by impregnating a nickel plaque by a series of steps comprising

a. wetting the porous nickel plaque in a solution which contains cadmium cations with the solution having an acidic pH,

b. precipitating the cadmium ions in the form of a cadmium-

ion compound from the solution in the porous nickel plaque

characterized in that

prior to impregnating the nickel plaque, the nickel plaque is first wetted with a water-containing solution and then air-oxidized in the temperature range between 200° and 500° C for a time period between 1 minute and 5 hours so as to passivate the nickel plaque against acidic attack during impregnation.

4,032,698

POLYMERIC MATERIALS WITH SUBSTITUTED UREA END GROUPS

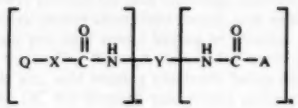
Thomas A. Ashe, Kansas City, Mo., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 329,152, Feb. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 133,452, April 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 39,534, May 21, 1970, abandoned. This application Oct. 29, 1975, Ser. No. 626,754

Int. Cl.² C08F *20/18*

U.S. Cl. 526—14 **9 Claims**

1. A polymeric material represented by the structure



where

Q is a resinous polymeric or copolymeric segment of

a. an ester of acrylic acid or methacrylic acid with an alkanol of 1–18 carbon atoms;

b. styrene or acrylonitrile;

c. a vinyl ester whose ester moiety contains 2–18 carbon atoms; or

d. a vinyl ether;

X is the residue of a chain transfer agent;

Y is the residue of a di-, tri-, or tetraisocyanate radical after removal of isocyanate groups;

A is the residue of a basic radical which, as an entity before reaction, has a pk_a value of 5–14, or a salt thereof; and

m and *n* are 1, 2 or 3, the total not exceeding 4, provided that when *n* is 2 or 3, only one of A need be as defined.

4,032,699

FLUID RESISTANT TERPOLYMER COMPOSITIONS

Arthur C. West, III, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sept. 15, 1975, Ser. No. 613,225

Int. Cl.² C08F *214/22*

U.S. Cl. 526—18 **5 Claims**

1. A fluorinated terpolymer curable to a fluid resistant elastomer consisting essentially of 55 to 70 mol percent vinylidene fluoride, 25 to 40 mol percent hexafluoropropene and 1 to 8 mol percent chlorotrifluoroethylene to a total of 100 mol percent.

4,032,700

PROCESS FOR THE PREPARATION OF AMINATED POLYMERS USEFUL AS ADDITIVES FOR FUELS AND LUBRICANTS

Won R. Song, Maplewood; John Brooke Gardiner, Mountainside, and Lawrence James Engel, Green Brook Township, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 373,511, June 25, 1973. This application Sept. 15, 1975, Ser. No. 613,052

Int. Cl.² C08F *8/26*; C08G *8/32*

U.S. Cl. 526—43 **9 Claims**

1. A method for preparing an oil-soluble, sludge dispersing, aminated copolymer, said aminated copolymer having a molecular weight in the range of about 1000 to 500,000 Mn, and containing about 0.02 to about 2.0 wt. % nitrogen, based on the weight of said aminated copolymer, comprising the steps of solution brominating a terpolymer having an olefinic double bond in a hydrocarbon moiety which is pendant to the backbone chain of carbon atoms with a brominating agent to incorporate from about 0.1 to 10 wt. % viscinally substituted bromine in said pendant hydrocarbon moiety, said terpolymer comprising ethylene, a C_3 to C_{18} straight or branched chain α-olefin and a C_5 to C_{14} acyclic or alicyclic non-conjugated diolefin, said solution brominating step being carried out at a temperature of from 0° to 100° C.; and thereafter aminating said brominated terpolymer with a C_1 to C_{60} amine containing 1 to 12 amine groups by reacting said amine with said brominated terpolymer until from about 10 to 100 mole percent of the bromine content of said terpolymer is replced by amination groups, said reacting being carried out at a temperature in the range of about 20° C. to about 150° C. and for a period of from 0.1 to 10 hours.

4,032,701

CONTINUOUS METHOD FOR PRODUCING A DRY, SOLID POLYACRYLAMIDE

John Hughes, Arlington Heights, Ill., assignor to American Colloid Company, Skokie, Ill.

Filed Sept. 5, 1975, Ser. No. 610,547

Int. Cl.² C08F *2/00, 120/00, 120/56*

U.S. Cl. 526—88 **5 Claims**

1. A process for producing dry, solid, polyacrylamide which comprises forming an aqueous mixture consisting essentially of from 60 to 80%, by weight, of acrylamide and from 20 to 40%, by weight, of water; heating said aqueous mixture to a temperature of between about 50° C and 100° C to form a one phase liquid aqueous composition; depositing, separately on a moving surface (1) said aqueous one phase liquid and (2) a catalytically effective amount of an aqueous solution of a water soluble polymerization catalyst for acrylamide, in such a manner so as to form a mixture of said one phase aqueous liquid and said aqueous solution, said surface being heated to a temperature of between about 50° C and the charring point of acrylamide whereby the acrylamide exothermically polymerizes to form polyacrylamide thereby causing all of the water to evaporate and forming a dry, solid polyacrylamide and removing said polyacrylamide from said surface.

4,032,702

PRODUCTION OF SURFACE ACTIVE MATERIAL

Kenneth James, Reading, England, assignor to Tate & Lyle Limited, London, England

Filed Oct. 15, 1975, Ser. No. 622,495

Claims priority, application United Kingdom, Oct. 17, 1974, 45122/74; Apr. 18, 1975, 16222/75

Int. Cl.² C07H *13/06*

U.S. Cl. 536—119 **16 Claims**

1. A process for the preparation of a surface active material comprising reacting solid particulate sucrose with at least one alkyl ester of a fatty acid having 1 to 6 carbon atoms in the alkyl moiety and at least 8 carbon atoms in the fatty acid

moiety, in the presence of a basic trans-esterification catalyst, at a temperature from 110° to 140° C, at atmospheric pressure without intentionally distilling alcohol by-product and in the absence of any solvent.

4,032,703

PROCESS FOR THE POLYMERIZATION OF UNSATURATED COMPOUNDS

Salvatore Cucinella, and Alessandro Mazzei, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed July 1, 1975, Ser. No. 592,249

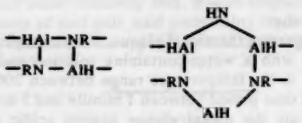
Claims priority, application Italy, July 1, 1974, 24659/74

Int. Cl.[2] C08F *4/64, 4/68, 4/60, 36/08*

U.S. Cl. 526—163 **5 Claims**

1. Process for the polymerization of compounds containing at least one olefinic unsaturation characterized in that the reaction is carried out in the presence of a catalyst system consisting of a transition metal compound together with an aluminum hydride derivative selected from

a. oligomer N-alkyliminoalanes consisting of a variety of four and/or six atom rings of the type



in which R is an aliphatic, cycloaliphatic or aromatic hydrocarbon radical, joined to one another to give high purity cage tridimensional structures having the composition $(HAl\text{-}NR)_n$ in which R has the aforesaid meanings n is an integer lower than or equal to **10**, and the hydridge hydrogens may be also partially substituted by halogen atoms; and

b. aluminum hydride ring condensed mono - or poly-cyclic oligomer derivatives having the general formula

$$(XAlNR)_x(XYAl)_y(NHR)_n$$

in which R is an aliphatic, cycloaliphatic, or aromatic hydrocarbon radical; X and Y, the same or different, ar hydride hydrogen and/or halogen atoms directly bound to aluminum, the number of halogen atoms being lower than $x+2y$ and the different therefrom consisting of hydride hydrogen atoms; the $x+y$ sum is an integer lower than or equal to 10, y being an integer other than zero; x and y do not necessarily refer to repeated imine or amine unities having the same composition, based on the meansing of X and Y.

4,032,704

METHOD AND APPARATUS FOR TREATING A METAL MELT

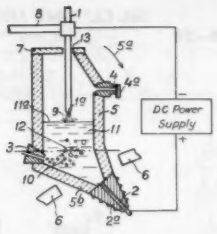
Sven Einar Stenkvist, Vasteras, Sweden, assignor to Asea Aktiebolag, Vasteras, Sweden

Filed Sept. 17, 1975, Ser. No. 614,214

Claims priority, application Sweden, Sept. 20, 1974, 7411831

Int. Cl.² H05B 7/20

U.S. Cl. 13—10 6 Claims



1. A convertor for treating a metal melt by injecting into the melt a material which does not add heat to the melt during the injecting, comprising a vertically elongated vessel for containing the melt and which tilts between substantially vertical and substantially horizontal positions, said vessel having a top which can be open for charging the vessel with the melt, and a side having a tap hole and which is downward when the vessel is in its said horizontal position for tapping the melt, said vessel having a lower portion and a nozzle pointing into this lower portion for said injecting, said lower portion having an electric power connector therein and which is contacted by the melt and said vessel having an electric arc heating electrode depending through its top for heating the melt by an electric arc, said heating electrode being adapted to be powered by DC fed through said power connector and melt and the heating electrode via said arc.

4,032,705

CONSUMABLE ELECTRODE FURNACE CRUCIBLES

Patrick J. Wooding, Moorestown, N.J., assignor to Wooding Corporation, Moorestown, N.J.

Filed Sept. 24, 1975, Ser. No. 616,365

Int. Cl.² F27D 1/12

U.S. Cl. 13—32 9 Claims

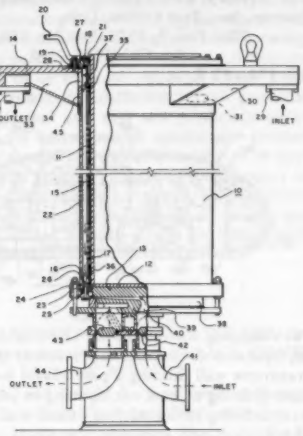
1. A crucible used in a consumable electrode furnace comprising:

an electrically conductive crucible body;

a crucible jacket disposed coaxially with the crucible body;

an electrically conductive water guide disposed coaxially with and between the jacket and the crucible body; and

means electrically interconnecting the lower portion of the crucible body to the lower portion of the water guide and electrically insulating the remainder of the water guide from the crucible body, whereby the water guide provides



a return coaxial conductive path during operation of the furnace.

4,032,706

RESIN-ENCASED MICROELECTRONIC MODULE

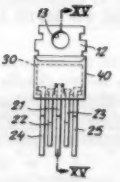
Raimondo Paletto, Milan, Italy, assignor to SGS-ATES Componenti Elettronici S.p.A., Milan, Italy

Filed Sept. 23, 1974, Ser. No. 508,951

Claims priority, application Italy, Sept. 26, 1973, 29390/73

Int. Cl.² H05K 5/06

U.S. Cl. 174—52 PE 4 Claims



1. A microelectronic module comprising:

a sheet-metal plate with an upper and a lower face;

a semiconductive chip supported on the upper face of said plate;

a set of conductive tongues including a central tongue conductively and mechanically secured to said plate, a pair of intermediate tongues flanking said central tongue, and a pair of outer tongues flanking said intermediate tongues, said intermediate and outer tongues being connected to respective terminals of said chip; and

a resinous body encasing said chip and three sides of said plate while leaving the lower face thereof exposed, said tongues being partly imbedded in said body and having portions projecting generally parallel to one another from a side of said body, said projecting portions being alternately bent upwardly and downwardly outside said body to increase the spacing of their free ends;

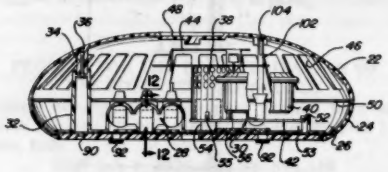
said plate having an edge confronting said tongues and forming an upwardly open median recess, said central tongue having a downwardly bent encased extremity received in said recess, said intermediate tongues having T-shaped encased ends offset from said encased extremity, said outer tongues having outwardly pointing L-shaped encased ends offset from said T-shaped ends.

4,032,707

HOUSING FOR BATTERY-OPERATED DEVICE

John M. Trenary, Fort Collins, Colo., assignor to Teledyne Industries, Inc., Fort Collins, Colo.

Filed Feb. 9, 1976, Ser. No. 656,313
Int. Cl.² H05K 5/00
U.S. Cl. 174—52 R 14 Claims



1. In a housing for containing electrical components of a battery-operated device, the improvement comprising:

a transverse wall forming a part of said housing;

means defining at least one opening in said wall;

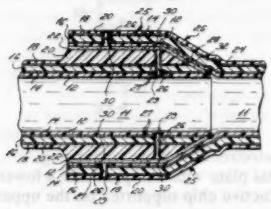
means defining in one surface of said wall adjacent to said and a support web suspended from said wall in a position spaced from and opposite said opening, the surface of said web facing said wall including means defining a second succession of cavities each sized to seat a battery and aligned with a respective cavity in said first succession so as to captivate such a battery therebetween.

4,032,708

HIGH VOLTAGE ELECTRICAL TRANSMISSION LINE AND CONDUIT THEREFOR AND METHOD OF MAKING SAME

Jonas Medney, 3504 Woodward St., Oceanside, N.Y. 11572

Filed Mar. 1, 1976, Ser. No. 662,960
Int. Cl.² H01R 5/00
U.S. Cl. 174—84 R 12 Claims



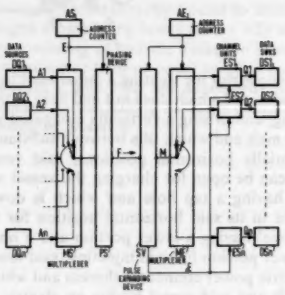
1. In combination, an end-to-end operative arrangement of hollow pipes for housing a high voltage transmission line or the like, each pipe comprising an improved insulator tube containing at least one electrically conductive coaxial layer in said insulator tube serving as an electrostatic shield, said insulator tube of adjacent pipes being disposed in telescoped relation with an optimum minimum clearance therebetween to facilitate said telescoping, said clearance being bounded on one side by an inner surface of an outer insulator tube and on the other side by said outer surface of an inner insulator tube, radially oriented electrically conductive elements in said insulator tubes in electrical contact with said electrostatic shields thereof and communicating with said clearance, and an electrically conductive adhesive in said clearance in contact with said bounding surfaces of said insulators and in contact with said radially oriented conductors, whereby said adhesive simultaneously completes said adhesive interconnection of said insulations of said adjacent pipe and also establishes the electrical continuity between said electrostatic shields of adjacent ones of said insulator tubes.

4,032,709

CIRCUIT ARRANGEMENT FOR LENGTHENING A STOP ELEMENT AT THE RECEIVER IN A CHARACTER-FRAME-GOVERNED TIME DIVISION MULTIPLEX DATA TRANSMISSION SYSTEM

Konrad Reisinger, Zorneding, and Ludwig Holzl, Sauerlach, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 19, 1976, Ser. No. 668,520
Claims priority, application Germany, Mar. 20, 1975, 2512303
Int. Cl.² H04L 5/00
U.S. Cl. 178—50 4 Claims



1. In a character frame governed time division multiplex (t.d.m.) data transmission system wherein a t.d.m. signal is transmitted via a transmission link to a receiver multiplexer having outputs connected, respectively, to channel units, the outputs of said channel units being connected, respectively, to data sinks, the improvement comprising:

a stop element lengthening apparatus centrally interposed in the received t.d.m. signal path between said transmission link and said receiver multiplexer for producing a timing signal and sequentially coupling said timing signal to said channel units, and for coupling information portions of the data signals to said channel units, the channel units, respectively, being triggered by said timing signal, the stop element lengthening apparatus comprising:

means for generating a sequence of sampling pulses occurring substantially in the centers of the signal components of the received t.d.m. data signals, each said sampling pulse corresponding to a respective signal component,

first counter means connected to receive said sampling pulses as counting pulses,

gate means for emitting a blocking signal when, during the duration of said sampling pulses, a start element of the data signal is indicated and a predetermined count is reached or exceeded by said first counter means,

second counter means connected to receive said blocking signal as a counting signal and including resetting means operable responsive to the exceeding of said predetermined count,

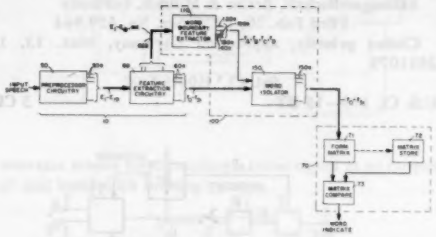
third counter means connected to receive said sampling pulses as counting pulses and

means for producing said timing signal when said second and third counter means register equal counts.

4,032,710
WORD BOUNDARY DETECTOR FOR SPEECH RECOGNITION EQUIPMENT

Thomas B. Martin, Delran; Marvin B. Herscher, Cherry Hill, and Robert B. Cox, Cinnaminson, all of N.J., assignors to Threshold Technology, Inc., Delran, N.J.

Filed Mar. 10, 1975, Ser. No. 556,633
Int. Cl.² G10L *1/00*
U.S. Cl. 179—1 SA **11 Claims**



1. In an apparatus which recieves acoustic input, said input including words spoken in isolation, and performs recognition functions on said words, said apparatus including means for generating feature signals indicative of feature characteristics in the received input and means for comparing the feature signals which occur during determined time boundaries with stored features corresponding to words in a vocabulary; an improved system for detecting word boundaries, comprising:

a. means responsive to said input for generating a first feature signal indicative of the presence of speech-like sounds which meet a first selection criterion;

b. means for storing the feature signals which occur during the presence of said first feature signal;

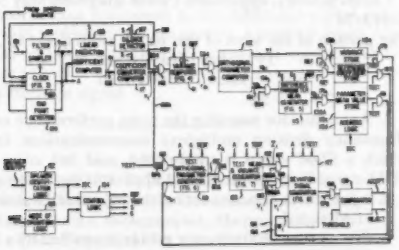
c. means responsive to said input for generating a second feature signal indicative of the presence of speech-like sounds which meet a second selection criterion; and

d. means for determining the substantially last occurrence of said second feature signal among the stored feature signals, the end boundary of an input spoken word being determined as a function of said last occurrence.

4,032,711
SPEAKER RECOGNITION ARRANGEMENT

Marvin Robert Sambur, Randolph Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 31, 1975, Ser. No. 645,520
Int. Cl.² G10L *1/00*
U.S. Cl. 179—1.5 B **31 Claims**

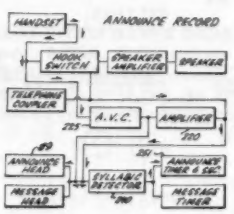


1. A speaker recognition system comprising means for forming a set of reference prediction parameter signals from a prediction anaylsis of the utterances of an identified speaker, means responsive to said reference prediction parameter signals for generating a prescribed set of reference coefficient signals adapted to transform said reference prediction parameter signals into a set of signals representative of the identity of said identified speaker, means jointly responsive to said reference prediction parameter signals and said reference coefficient signals for generating a set of first signals characteristic of the identity of said identified speaker, means for forming a set of test prediction parameter signals from a prediction analysis of the utterances of an unknown speaker, means jointly responsive to said reference coefficient signals generated for said identified speaker and said test prediction parameter signls generated for said unknown speaker for producing a prescribed set of second signals characteristic of an hypothesized identity of the unknown speaker with reference to said identified speaker, and means for comparing said prescribed set of first signals with said prescribed set of second signals to verify said hypothesized identity of said unknown speaker as said identified speaker.

4,032,712
TELEPHONE ANSWERING DEVICE WITH SEPARATE ANNOUNCEMENT ERASE AND PLAYBACK CONTROL TIMING PERIODS

Kenneth A. Catto, and Harold R. Burt, both of Beauertum, Oreg., assignors to Data Time, Inc., Portland, Oreg.

Continuation of Ser. No. 408,641, Oct. 23, 1973, abandoned, which is a division of Ser. No. 308,970, Nov. 24, 1972, Pat. No. 3,833,186. This application Apr. 25, 1975, Ser. No. 571,808
Int. Cl.² H04M *1/64*; G11B *15/02*
U.S. Cl. 179—6 R **2 Claims**



1. In a telephone answering device having an announcement tape, a first system for erasing an old announcement on the tape and for recording thereon a replacement announcement fed into the system, and a second system for playing back the tape and reproducing an announcement recorded thereon, the improvement comprising

means in the first system responsive to the termination of the replacement announcement for erasing the tape for a predetermined time interval after the replacement announcement has terminated, and

means in the second system for terminating playing back of the tape a predetermined time interval after the announcement has concluded, which interval is shorter than the first-mentioned time interval.

4,032,713
RECORDING TAPE CONTROL ARRANGEMENT FOR TELEPHONE ANSWERING APPARATUS

Paul Fahlenberg, Baierbrunn, Germany, assignor to Compur - Electronic Gesellschaft mit beschraenkter Haftung, Munich, Germany

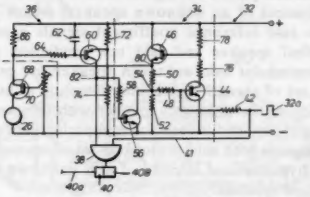
Filed Mar. 14, 1975, Ser. No. 558,295
Claims priority, application Germany, Apr. 4, 1974, 2416374
Int. Cl.² H04M *1/64*
U.S. Cl. 179—6 R **11 Claims**

1. A circuit arrangement for use in a telephone answering apparatus responsive to ringing signals from a telephone company line and having a magnetic tape and a magnetic tape drive system, said circuit arrangement comprising:

detecting means for detecting said ringing signals;

first means for first effecting a drive to completely rewind said magnetic tape in response to the detected ringing signals from the telephone company line;

second means for producing a signal indicating that said magnetic tape is completely rewound; and



third means for effecting a forward play of said magnetic tape in response to a simultaneous occurrence of a ringing signal and said indicating signal.

4,032,714

PCM TIME DIVISION MULTIPLEX COMMUNICATION NETWORK WITH DIGITAL SUBSCRIBER STATIONS

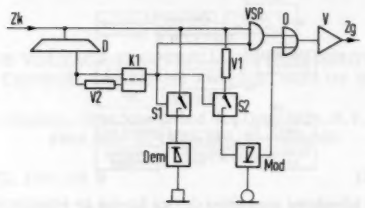
Alfred Mattern, Grobenzell, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed June 25, 1976, Ser. No. 699,957

Claims priority, application Germany, June 27, 1975, 2528840

Int. Cl.² H04J *3/06*

U.S. Cl. 179—15 BA **16 Claims**



8. A PCM time division multiplex communication network having a central processing office and a plurality of digital subscriber stations comprising:

means within the central processing office for generating an information signal, said information signal containing a special code word prefixed to the PCM data, whereby said special code word is used to designate a particular subscriber station intended for acceptance of the PCM data, said information signal further containing a PCM data portion having a special signal characteristic comprising bits which have widths clearly defined by jumps of set physical quantities, whereby said special signal characteristic is used to derive directly the timing signal of the designated subscriber station;

means within each subscriber station for retransmitting information signals which are not intended for said subscriber station, whereby said information signal is retransmitted without modification;

decoder means within each subscriber station for actuating said subscriber station in response to an information signal intended for said subscriber station, whereby said decoder means is responsive to the special code word of said information signal;

demodulation means within each subscriber station for demodulating the PCM data portion of said information signal, whereby the timing signal for said demodulation means is derived directly from said special signal characteristic of the PCM data portion of said information signal;

modulation means within each subscriber station for generating the output signal of said subscriber station, whereby said modulation means uses the PCM data portion of the information signal as a carrier bit group for the output signal of said subscriber station.

4,032,715

CIRCUIT ARRANGEMENT OF A STEREO-HUNTING DEVICE IN A STEREO DECODER

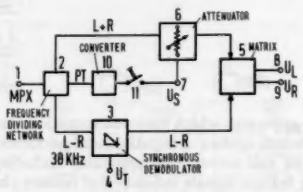
Dietmar Mallon, Zorneding, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 20, 1976, Ser. No. 659,944

Claims priority, application Germany, Mar. 13, 1975, 2511079

Int. Cl.² H04H *5/00*

U.S. Cl. 179—15 BT **3 Claims**



1. In a stereo receiving apparatus of the type which receives a stereo transmission having a pilot tone component and sum signal and difference signal components of two reproduction signals, and in which the sum signal and difference signal components are fed in respective channels to and are converted in a matrix operating with sum and difference formation to form the reproduction signals, and in which only the sum signal is present in the case of a mono-received signal, the improvement therein comprising:

control signal means for receiving the pilot tone signal and operable to produce a control signal in response to the absence of the pilot tone signal; and an attenuator interposed in the sum signal channel, said attenuator including a control input connected to said control means and operable to block the sum channel in response to said control signal.

4,032,716

MEASUREMENT OF NOISE IN A COMMUNICATION CHANNEL

Edgar Robert Allen, Stanmore, England, assignor to The Post Office, London, England

Filed May 23, 1975, Ser. No. 580,349

Claims priority, application United Kingdom, May 30, 1974, 24013/74

The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.

Int. Cl.² H04J *1/16*

U.S. Cl. 179—15 BF **7 Claims**

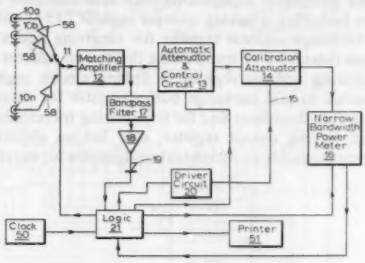
1. Apparatus for assessing the noise performance of a FDM (frequency division multiplex) communications link over which a FDM signal is transmitted, said link over which a FDM signal is transmitted, said apparatus comprising:

a. input terminal means for extracting a small fraction of the FDM signal,

b. first automatic attenuator means controlled by a first feed back loop and connected to an output of said input terminal means for attenuating said FDM signal to a predetermined level over a broad bandwidth,

c. bandwidth limiting means connected via a second automatic attenuator means to an output of said first automatic attenuator means for passing a bandwidth located within a communications channel, and

d. power measuring means connected to an output of said bandwidth limiting means, including said automatic attenuator means for measuring a noise signal at an output of said bandwidth limiting means.



4,032,717

CIRCUIT ARRANGEMENT FOR A CONTINUOUS ADJUSTMENT OF THE BASE WIDTH IN A STEREO DECODER

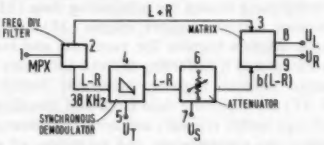
Dietmar Mallon, Zorneding, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 26, 1976, Ser. No. 661,766

Claims priority, application Germany, Mar. 13, 1975, 2511026

Int. Cl.² H04H *5/00*

U.S. Cl. 179—15 BT **5 Claims**



1. In a stereo decoder of the type in which received multiplex signal is split into a sum signal and a difference signal of two reproduction signals and are fed through a sum signal channel and a difference signal channel, respectively, to respective sum signal and difference signal inputs of a sum and difference matrix which is responsive thereto to form the reproduction signals, the improvement therein comprising:

a circuit arrangement for continuously adjusting the base width including control signal means for deriving a control signal in accordance with the signal strength of the received signal; and

attenuator means interposed in the difference signal channel, said attenuator means having a control input connected to said control signal means and operable in response to said control signal to control the attenuation of the difference signal.

4,032,718

FOUR-WIRE INTEGRABLE HYBRID

John Francis O'Neill, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 19, 1976, Ser. No. 687,622

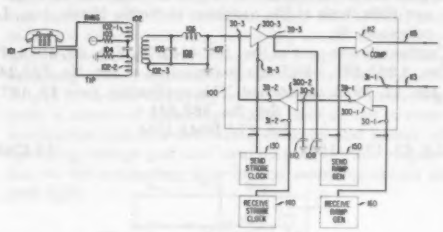
Int. Cl.² H04J *3/02*

U.S. Cl. 179—15 AA **13 Claims**

1. In a port circuit for a time-sampled switching system having a low-pass filter, the combination comprising:

a first high input impedance transmission path including means for periodically passively sampling voltages transmitted through said filter in one direction; and

a second transmission path having low output impedance coupled to said filter for applying thereto discrete current impulses at intervals substantially equal to the reciprocal of twice the cut-off frequency of said filter.



4,032,719

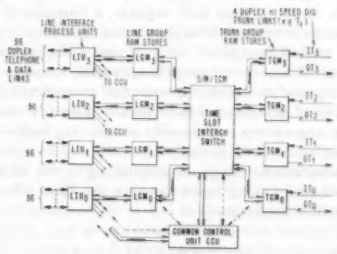
MODULAR SLOT INTERCHANGE DIGITAL EXCHANGE

Herman Blasbalg, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 26, 1975, Ser. No. 590,547

Int. Cl.² H04J *6/02;* **H04Q** *11/04*

U.S. Cl. 179—15 AS **15 Claims**


LINE INTERFACE PROCESS UNITS
LINE GROUP RAM STORES
TRUNK GROUP RAM STORES
TIME SLOT INTERCH SWITCH
COMMON CONTROL UNIT CCU

1. Common control digital switch apparatus for variably handling signals in digital form between locally accessible line multiples and time slot channels of locally accessible time divided digital trunk links comprising:

slot interchange storage switching means having time interchangeable randomly accessible line slot and trunk slot buffer storage spaces of different capacity, said spaces being subject to variably paired interchange association;

first means for passing information representational signals between said line slot spaces and selectively associated lines in respective said line multiples;

second means for passing information representational signals between said trunk slot spaces and selectively associated real time slot channels on said trunk links; and

common control means linked to said first and second means and said interchange storage means for variably establishing paired interchange associations of line slot and trunk slot spaces in random order, thereby effectively providing for remote signaling communication relative to said lines via randomly associated channels of said trunk links.

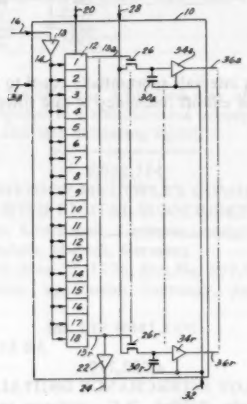
4,032,720
INTEGRATED DEMULTIPLEXING CIRCUIT WITH CONTINUOUSLY VARIABLE OUTPUTS

Eugene S. Morez, Morton Grove, and Douglas R. Moore, Vernon Hills, both of Ill., assignors to Norlin Music, Inc., Lincolnwood, Ill.

Continuation-in-part of Ser. No. 444,028, Feb. 20, 1974, Pat. No. 3,902,397, which is a continuation of Ser. No. 323,247, Jan. 12, 1973, abandoned. This application June 19, 1975, Ser. No. 588,331

Int. Cl.² H04J 3/04

U.S. Cl. 179—15 A **14 Claims**



1. A demultiplexing circuit for providing a plurality of output channels having continuously variable outputs, comprising a shift register having a plurality of stages, means for operating a first stage of said shift register, clock means connected with said shift register for causing said operated stage to propagate down the length of said shift register, a plurality of switches, means connecting each of said switches individually to a single stage of said shift register, each of said switches being operated when its associated stage is operated, means collectively connecting said switches to a source of an analog input signal, a plurality of sample-and-hold means, one for each of said switches, and means individually connecting said switches to said sample-and-hold means, whereby said sample-and-hold means manifests a voltage corresponding to the instantaneous voltage of said analog input signal at the time when its associated switch is operated.

4,032,721
STORED PROGRAM LOGIC SYSTEM USING A COMMON EXCHANGE CIRCUIT

Pierre Anizan, Paris, France, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

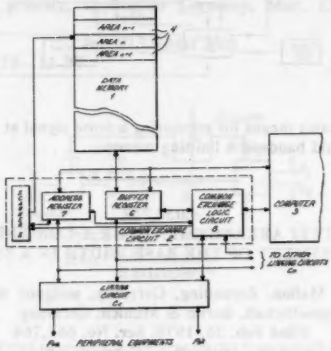
Continuation-in-part of Ser. No. 532,775, Dec. 16, 1974, abandoned, which is a continuation of Ser. No. 444,975, Feb. 22, 1974, abandoned, which is a continuation of Ser. No. 324,794, Jan. 18, 1973, abandoned, which is a continuation of Ser. No. 190,043, Oct. 18, 1971, abandoned. This application Dec. 29, 1975, Ser. No. 645,272

Claims priority, application France, Oct. 22, 1970, 70.38221

Int. Cl.² H04Q 3/54

U.S. Cl. 179—18 ES **1 Claim**

1. A stored program logic system for use with a plurality of peripheral equipments comprising: a data memory (1) having a plurality of addressed fields (4) for storing processable data, a common exchange means including scanning means (5) for selecting fields of said data memory, an exchange address register (7) for storing the address of the field to be selected by said scanning means, an exchange buffer register (6) connected to said data memory for receiving data from or transferring data to said data memory and exchange control (8) means for controlling the reception and transmission of addresses and data by said register; a linking means for interfacing the peripheral equipments with said common exchange means including a linking address register (13) connected to said exchange address register for receiving and storing an address therefrom or transferring thereto an address stored in said linking address register, a linking circuit register (12) connected to said exchange buffer register for receiving and storing data therefrom and for transferring thereto data stored in said linking circuit register, said linking circuit register being connectable to peripheral equipments for receiving data



therefrom and transferring data thereto, and linking control means (14) for controlling the transmission and reception of addresses and data by said registers; and a computer, said computer comprising means for processing data (15, 16, 17, 19), a computer address register means (25) connected to said exchange address register for receiving and storing addresses therefrom and transferring thereto addresses stored in said exchange address register, computer buffer register means (26, 27) for receiving data from and transferring data to said exchange buffer register, and computer control means for controlling the transmission and reception of addresses and data by said register means.

4,032,722
TELEPHONE DIALING ARRANGEMENT FOR CALLING A SINGLE PARTY

David Charles Antony Connolly, Shildon, and Robert Andrew Stevenson, Newton Aycliffe, both of England, assignors to The General Electric Company Limited, London, England

Filed Apr. 29, 1975, Ser. No. 572,934

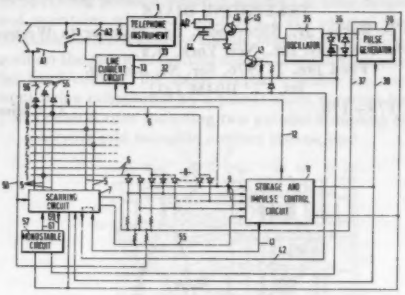
Claims priority, application United Kingdom, Apr. 30, 1974, 18927/74

Int. Cl.² H04M 1/272

U.S. Cl. 179—18 BB **9 Claims**

1. Telephone apparatus which is for connection over line wires to an automatic exchange and which has provision for supplying trains of dial impulses to enable a speech connection to be made through the exchange to only a single predetermined party, said telephone apparatus comprising a telephone instrument having a handset, a plurality of passive means each storing in preset manner a coded representation of the number of impulses of one of said trains, active electronic storage means, scanning means to scan said passive means to cause the numbers corresponding to the representations stored by the passive means to be written one at a time into the active electronic storage means, conversion means to cause trains of impulses to be generated in respect of the numbers stored by said storage means, and a single manually operable means upon operation of which said storage means,

said scanning means and said conversion means are brought into use to generate the trains of impulses subsequent to a call



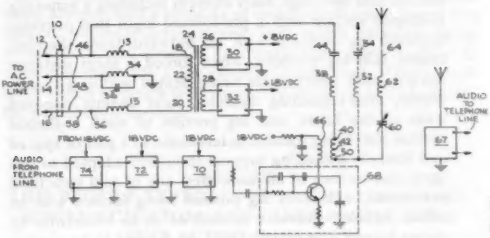
having been initiated by lifting the handset of the telephone instrument.

4,032,723

CORDLESS TELEPHONE SYSTEM

Luis Esteban Mendoza, 1806 Smokewood Ave., Fullerton, Calif. 92631

Filed Feb. 24, 1976, Ser. No. 661,017
Int. Cl.² H04Q *7/04*
U.S. Cl. 179—41 A **3 Claims**



1. A cordless, two-way telephone system, including:

a base station and

a mobile unit;

said base station including a first radio transmitter designed to operate in the range of 1.7 Mhz and a first radio receiver operable in the range of 27 Mhz;

said first radio transmitter including:

a power supply, a power cord coupled to said power supply and having at least first and second electrical conductors for connecting said power supply to a source of a.c. power, the length of said first conductor in said power cord being less than one-eighth of a wavelength in said range of 1.7 Mhz, said first conductor being maintained above ground potential, for signals in said 1.7 Mhz range, at its end coupled to said power supply,

a source of modulatable R-F signals connected to said power supply and powered thereby; and an antenna coil coupled to said source of R-F signals, said antenna coil having first and second terminals;

first means coupling said first terminal of said antenna coil to said first conductor, only, of said power cord;

an antenna conductor spaced from said first and second conductors and having a length substantially less than one-eighth wavelength in said range of 1.7 Mhz;

second means coupling said second terminal of said antenna coil to one end of said antenna conductor;

said mobile unit including a second radio transmitter and a second radio receiver;

said second radio receiver including a ferrite rod antenna, a first detector coupled to said ferrite rod antenna for producing I-F signals when said ferrite rod antenna is in the R-F field from said first radio transmitter;

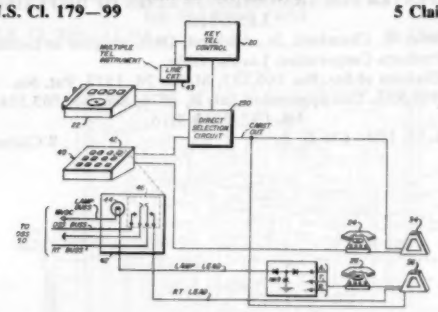
indicator means for indicating when the signal from said base station is below a level which permits communication between said base station and said mobile unit, said indicator means including rectifying means coupled to said first detector for rectifying the I-F signals therefrom, switching means responsive to the absence of adequate output from said rectifying means to enter a conducting state, a source of operating voltage, and an out-of-communication indicator connected between said source of operating voltage and said switching means and responsive to the conducting state of said switching means to emit light.

4,032,724

DIRECT STATION SELECTION CIRCUIT

Coy Edwin Matheny, Fulton, Ky., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 11, 1975, Ser. No. 603,327
Int. Cl.² H04M *1/72*
U.S. Cl. 179—99 **5 Claims**



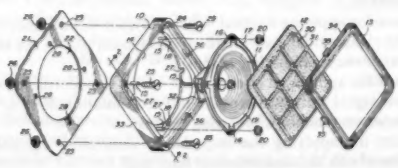
1. A direct station selection apparatus adapted for use in a key telephone system in which at least one station of the system is equipped with an audio receiver in addition to the speaker of the station telephone instrument, comprising a second station having means associated with said second station for directly connecting the second station to the audio receiver at the one station regardless of the condition of the one station as busy or idle, means responsive to the direct connection for initiating an audio signal for transmission to the additional audio receiver and to the station instrument of said one station, and means responsive to said connection for automatically placing on hold any telephone line in communication with said second station.

4,032,725

SPEAKER MOUNTING

Paul Dean McGee, Medinah, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sept. 7, 1976, Ser. No. 721,010
Int. Cl.² H04R *1/02;* **G12B** *9/04*
U.S. Cl. 179—146 R **9 Claims**



1. Apparatus for mounting a speaker having a cone on a

panel having an aperture provided to receive the speaker cone, said apparatus comprising:

a base having an opening formed to receive said speaker cone and having a raised peripheral flange;

first fastening means for fastening the base to the panel;

second fastening means for fastening the speaker to the base;

a speaker cover dimensioned to fit within the base raised peripheral flange and having a peripheral flange portion;

a resilient retainer positioned within the base and engaging the speaker cover peripheral flange portion; and

locking means formed between the resilient retainer and the raised peripheral portion of the base, said locking means for releasably coupling the resilient retainer and base.

4,032,726

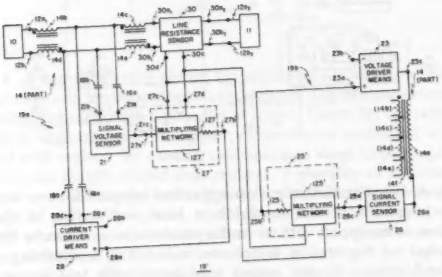
REPEATER FOR TRANSMISSION LINES OF DIFFERING LENGTHS

Charles W. Chambers, Jr., Amherst, Ohio, assignor to Lorain Products Corporation, Lorain, Ohio

Division of Ser. No. 560,257, March 20, 1975, Pat. No. 3,989,907. This application July 8, 1976, Ser. No. 703,556

Int. Cl.² H04B *3/16*

U.S. Cl. 179—170 G **8 Claims**



1. In an apparatus for modifiying the transmission characteristics of a telephone transmission line, the combination of:

means for generating a control signal proportional to the a-c losses of the transmission line;

shunt impedance simulating means for generating an impedance simulating current which varies in accordance with the signal voltage across the transmission line, the shunt impedance simulating means including first control signal responsive means for causing the magnitude of the impedance simulating current to vary directly with the product of the control signal and the signal voltage;

series impedance simulating means for generating an impedance simulating voltage which varies in accordance with the signal current through the transmission line, the series impedance simulating means including second control signal responsive means for causing the magnitude of the impedance simulating voltage to vary directly with the product of the control signal and the signal current;

means for applying a signal which varies in accordance with the signal voltage across the transmission line to the shunt impedance simulating means;

means for applying a signal which varies in accordance with the signal current through the transmission line to the series impedance simulating means;

means for applying the impedance simulating current in shunt with the transmission line; and

means for applying the impedance simulating voltage in series with the transmission line.

4,032,727

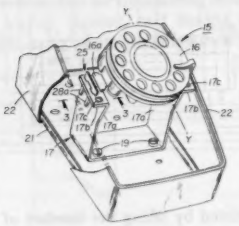
RELEASABLY LOCKED MOUNTING ASSEMBLY FOR TELEPHONE DIALS

William S. Burns, Jr., Shreveport, La., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,296

Int. Cl.² H04M *1/02*

U.S. Cl. 179—178 **23 Claims**



1. A mounting assembly for releasably supporting a telephone dial, the latter including a pair of mounting tabs extending from the opposite sides thereof, within a housing, comprising:

dial support means secured within said housing, and having at least a pair of spaced structural extensions formed with openings therein;

a pair of resilient mounting elements seated within selected ones of said openings, each element including a generally U-shaped section with a pre-formed bight that provides opposed leg portions with an outward taper therebetween, said leg portions, when forced a short distance toward each other upon being seated within an associated, area-restricting opening, bear against opposed walls of the latter, one leg portion of each U-shaped section also being formed to terminate in a pair of spaced and laterally extending support shoulders adapted to rest upon one surface of an associated one of said structural extensions, with other leg portion being formed with an offset, beveled shoulder located so as to inherently be spring-biased, as a result of said pre-formed bight, against the other surface of said associated structural extension and, thereby effect the reliable positioning and releasable locking of the resilient element thereto, said one leg portion also having at least an associated integral end section that is formed with at least one fastening means-receiving aperture, and

fastening means extending through said apertures for respectively securing said mounting elements to said dial mounting tabs, whereby said dial is releasably mounted, through said elements, on said support means.

4,032,728

PUSH BUTTON SWITCH

Jürgen Oelsch, Braunschweig, Germany, assignor to Olympia Werke AG, Wilhelmshaven, Germany

Filed Dec. 10, 1975, Ser. No. 639,607

Claims priority, application Germany, Dec. 20, 1974, 2460485

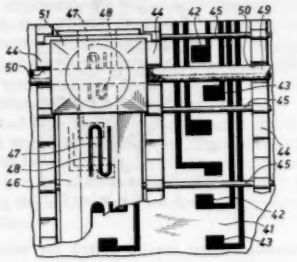
Int. Cl.² H01H *13/70, 1/06, 21/02*

U.S. Cl. 200—5 A **25 Claims**

1. A push button switch mounted on a conductor-carrying insulator plate and having a push button to which an external operating force can be applied; an electrically conducting, resilient switch element including a movable contact means and arranged on the plate within the operating range of the push button for effecting a transmission of the operating force from the push button to the switch element; at least one fixed contact carried by the plate; the switch element having a normal position which it assumes and maintains when no operating force is exerted thereon by the push button; in the

normal position the movable contact means being out of engagement with the fixed contact; the switch element having an operating position which it assumes in snap action motion and maintains when the operating force exerted thereon by the push button reaches a certain magnitude; in the operating position the movable contact means being in engagement with the fixed contact; the improvement wherein said switch element being constituted by a planar sheet member having

a. a central zone including two parallel bounding edges and carrying said movable contact means; and



b. strip-like legs integral with said central zone and extending from said edges towards said plate at an inclination with respect to said central zone that is greater than 90°; said legs being positioned on said plate at conductor-free portions thereof.

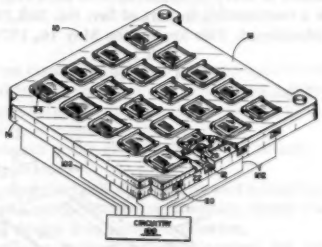
11. A push button switch as defined in claim **1**, wherein there are provided a plurality of switch elements disposed in a spaced, coplanar arrangement; said switch elements being formed from and attached to a single sheet plate member to constitute therewith a one-piece structure; each of the plurality of switch elements forming part of an independently operable push button switch.

4,032,729

LOW PROFILE KEYBOARD SWITCH HAVING PANEL HINGED ACTUATORS AND CANTILEVERED BEAM SNAP ACTING CONTACTS

Clayton W. Koistinen, La Habra, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 21, 1973, Ser. No. 427,173
Int. Cl.² H01H *13/26;* **R41J** *5/00;* **G06C** *7/02*
U.S. Cl. 200—5 A **13 Claims**



1. A keyboard switch assembly comprising:

at least one elongated stationary lower contact member;

at least one elongated upper contact member;

said upper contact member having a substantially concave configuration;

a housing including a base member and a cover member;

said cover member engaging said base member;

said base member having at least one groove for securing said lower contact member;

said base member including ridges adjacent each groove for supporting said upper contact member transferse to said lower contact member;

said ridges having indentations along at least one wall thereof;

each upper contact member having at least one movable section which is supported at one end as a cantilevered beam;

said movable section being aligned with an associated indentation; and

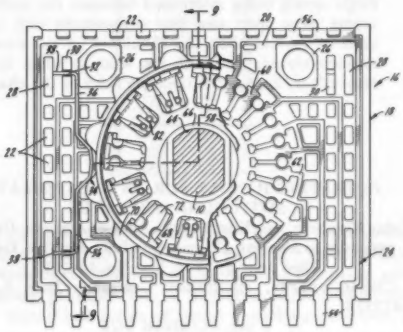
key means supported by said cover member for selectively forcing said movable section to buckle at the supported end thereof over the associated indentation and causing the end of said movable section to make electrical contact with said lower contact member.

4,032,730

ROTARY SWITCH HAVING A STATOR WITH A CONDUCTIVE MATRIX

Bernard J. Golbeck, Crystal Lake; Raymond F. Lewandowski, Mount Prospect, and Maurice E. Kennedy, Crystal Lake, all of Ill., assignors to Oak Industries Inc., Crystal Lake, Ill.

Filed Mar. 29, 1976, Ser. No. 671,510
Int. Cl.² H01H *19/08*
U.S. Cl. 200—11 DA **20 Claims**



1. A rotary switch including a stator, a rotor and shaft for said rotor,

said stator having a non-conductive support member and a complex conductive matrix positioned on one side thereof, said matrix and support member having respective and cooperating openings and projections for positioning said matrix on said support member, terminals on said matrix,

said complex conductive matrix including a plurality of crossing, independent, conductive sections integrally joined to form a network of lines extending in different directions toward the periphery of said matrix,

said rotor having a plurality of pockets with contact members positioned in at least one of said pockets and arranged for electrical contact with portions of said matrix.

4,032,731

PUSH-PULL SWITCH FOR USE IN AN ELECTRONIC WATCH

Maurice Cyril Bryceland, Dover, N.J., assignor to Waldman Corporation, Parsippany, N.J.

Filed Jan. 20, 1976, Ser. No. 650,716
Int. Cl.² H01H *15/24, 13/52*
U.S. Cl. 200—16 B **8 Claims**

1. A push-pull switch comprising

a. a housing having an axial bore and an internal chamber connected to the bore;

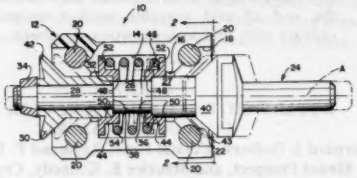
b. metallic contact means at each axial end of the housing;

c. a stem axially displaceable in the bore between first and second terminal positions and having a pair of spaced

shoulders defining a central stem portion of reduced diameter;

d. a pair of spaced metallic contact means on the stem for respectively engaging the cosntact means at one end of the housing or the other depending upon whether the stem is in its first or second terminal position; and

e. means including a pair of washers in said chamber and a single spring resiliently deflectable upon axial displacement of the stem from a central position at which the



contact means of the stem are spaced from the contact means of the housing, the spring serving to bias the stem into said central position, each washer having an aperture that slidably receives the reduced portion of the stem, the single spring being interposed between the washers for urging them apart and into engagement with opposite sides of the chamber, the shoulders on the stem being respectively engaged with the washers when the latter respectively engage the opposite sides of the chamber.

4,032,732
OPERATING HANDLE FOR AN ENCAPSULATED SWITCHING APPARATUS

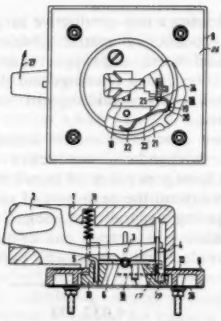
Heinz Homberg, and Kurt Franke, both of Amberg, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed June 5, 1975, Ser. No. 584,010

Claims priority, application Germany, June 6, 1974, 2427314

Int. Cl.² H01H 9/20

U.S. Cl. 200—50 A **4 Claims**



1. In an operating handle for an encapsulated switching apparatus including a housing having a door and a stationary switching shaft, said handle being fastened to said door of said housing in a switched-on position of the apparatus by means of a spring-loaded, shiftable locking plate, said plate being shifted against the force of a loading spring in a switched-off position of said apparatus into a position in engagement with a stop member for releasing said switching shaft from said locking plate, wherein the improvement comprises said stop member being formed by a resilient detent spring disposed within said operating handle, the restraining force of which can be overcome by an operating force applied to said handle.

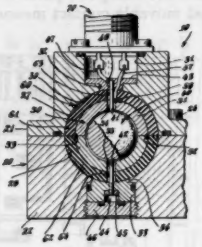
4,032,733
OMNIDIRECTIONAL INERTIA SWITCH

Daniel Thomas Meisenheimer, Jr., 404 Longmeadow Road, Orange, Conn. 06477

Filed Oct. 6, 1975, Ser. No. 620,064

Int. Cl.² H01H 35/14

U.S. Cl. 200—61.45 R **10 Claims**



1. An omnidirectional inertia switch for sensing inertial loads on an object comprising:

A. a member having a spherical surface, said member mounted stationary with respect to the object on which inertial loads are to be sensed;

B. a spherical seismic mass adapted to be positioned concentrically with respect to the spherical surface of said stationary member;

C. a deformable elastomeric suspension member surrounding said spherical seismic mass and supporting it concentrically with respect to the spherical surface of said stationary member, said suspension member having substantially uniform deformability about said spherical seismic mass; and

D. means for sensing contact between said spherical seismic mass and the spherical surface of said stationary member, whereby the application of an inertial load on the object causes relative movement of said spherical seismic mass toward the spherical surface of said stationary member, and if the inertial load is sufficiently large, causes contact therebetween.

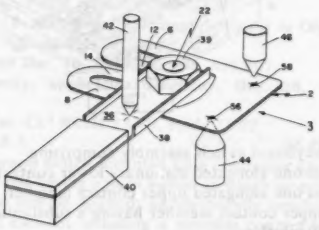
4,032,734
SNAP-ATING MECHANISMS

Hadley K. Burch, Pittsfield, Vt., assignor to B/K Patent Development, Inc., Highland Park, Ill.

Continuation of Ser. No. 418,372, Nov. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 360,393, May 14, 1973, abandoned. This application May 16, 1975, Ser. No. 578,148

Int. Cl.² H01H 13/36

U.S. Cl. 200—67 DA **10 Claims**



1. In a snap-acting mechanism comprising a snap-acting generally planar blade of resilient material including a pair of outer legs, a pair of inner legs extending between said outer legs, and connecting portions each connecting said legs into a

unitary structure, said connecting portions defining, for each of said pairs of legs, an unstressed leg separation; means for maintaining one of said pairs of legs with a separation different from said unstressed separation, thereby to stress said blade and bias a portion thereof in a direction transverse to the plane of said blade; support means supporting the inner legs; and movable actuator means for causing the blade to snap from a first position of stability to a second position of stability;

the improvement comprising

first fixed stop means on the support disposed to the side of the blade that is in the direction of actuating movement of said actuator means, and positioned to engage the blade when the latter is in its first position of stability but to be spaced apart from the blade when the latter is in its second position of stability;

second fixed stop means on the support non-coaxial with the first stop fixed stop means, disposed to the other side of the blade, and positioned to be spaced apart from the blade when the latter is in its first position of stability but engaging the blade when the latter is in its second position of stability.

4,032,735
CONTACT UNIT

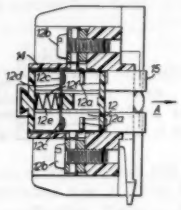
Edmund Morton Butterworth, Bedford, England, assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Aug. 7, 1975, Ser. No. 602,922

Claims priority, application United Kingdom, Aug. 29, 1974, 37776/74

Int. Cl.² H01H 67/02

U.S. Cl. 200—68 **6 Claims**



1. An add-on contact unit for an electromagnetic switching device operable between a deenergized, spring biased first postion and an energized second position, said add-on contact unit comprising, in combination:

actuating means positively coupled to the actuator of said switching device;

a plurality of contact sets operated by said actuating means, at least one contact set being normally closed when said switching device is in said first position;

contact pressure springs for each contact set operating between said contact set and said actuating means, said contact pressure spring of said normally closed contact set and said spring biasing said switching device to said first position providing parallel, oppositely disposed spring forces; and

means retaining said actuator means and said switching device in said first position against the bias of said contact pressure spring for said normally closed contact set and against the operating force of said switching device upon energization until the latter force exceeds a threshold value.

4,032,736
GAS-PRESSURIZED ELECTRICAL SWITCH WITH CURRENT-GENERATED MAGNETIC FIELD FOR ASSISTING ARC EXTINCTION

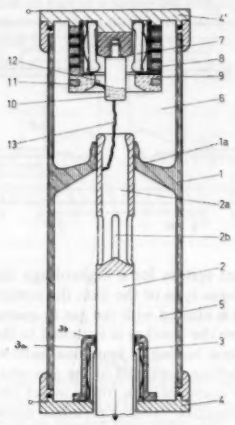
Stanislas Ruffieux, Baden, and Ekkehard Schade, Wettingen, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Aug. 6, 1975, Ser. No. 602,185

Claims priority, application Switzerland, Aug. 20, 1974, 11323/74

Int. Cl.² H01H 33/18

U.S. Cl. 200—147 R **5 Claims**



1. In a gas pressurized electrical switch with a current generated magnetic field for assisting arc extinction the combination comprising a casing forming a quenching enclosure, said casing being provided with a transverse wall dividing the interior thereof into a pair of closed quenching chambers, a pressurized arc quenching gas filling said chambers, a longitudinally movable contact member located centrally in a first one of said chambers and which includes a nozzle pipe projecting through said transverse wall into the other quenching chamber, a stationary annular contact member mounted in said other quenching chamber opposite the nozzle pipe of said movable contact member for engagement therewith, the part of said nozzle pipe located in said first quenching chamber including openings through the wall which establish a communication between said quenching chambers, a stationary electrically conductive pin located centrally within said stationary contact member and electrically insulated therefrom, said pin being spaced radially from said stationary contact member so as to provide for passage therebetween of the nozzle pipe of said movable contact member, a magnetic-field producing coil surrounding said annular contact member and having one end thereof electrically connected to the same terminal member on said switch to which said stationary contact member is connected so as to carry the switch current after said contact members have disengaged, and an annular electrode electrically connected to the other end of said coil and which surrounds and is spaced from said pin, whereby following initial disengagement of said nozzle pipe from said stationary contact member a first arc is established between said annular electrode and said pin and a second arc is established from said pin to the internal surface of said nozzle pipe thereby effecting current flow through said coil and production of a magnetic field inducing rotation of said first arc and heating of said gas in said other chamber to increase its pressure and effect an arc extinguishing gas flow therefrom through said nozzle pipe and into said first chamber.

4,032,737
CONTACT SYSTEM FOR HIGH-VOLTAGE POWER CIRCUIT BREAKERS

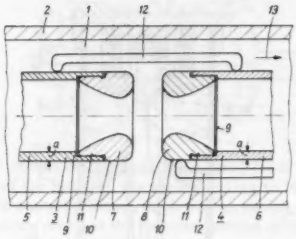
Peter Huhse; Heiner Marin; Harald Kurzmann, and Marion Henry, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 19, 1974, Ser. No. 507,629

Claims priority, application Germany, Oct. 5, 1973, 2350702

Int. Cl.² H01H *33/00, 1/02*

U.S. Cl. 200—148 R **6 Claims**



1. In a contact system for a highvoltage circuit breaker of the compressed-gas type or the like, the contact system defining a gap which is blasted with the gas to quench an arc drawn thereacross when the breaker is switched to the open position, the contact system having at least one hollow, nozzle-shaped contact piece defining one end of the gap when the breaker is switched to the open position, the contact piece including an electrically conductive tubular member made of cold workhardened copper, the tubular member having an end portion, and a nozzle-shaped body made of graphite, the nozzleshaped body being cold press-fitted into the tubular member at the end portion thereof so as to be held in surrounding engagement thereby in a friction-tight manner wherein the improvement comprises making said tubular member of a low alloy copper having a silver content in the range of from 0.025 to 0.25 percent.

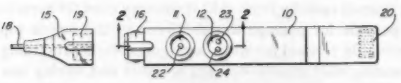
4,032,738
ELECTRO-SURGICAL INSTRUMENT

Janet M. Esty, Boulder, and Charles E. Taylor, Evergreen, both of Colo., assignors to Neomed Incorporated, Boulder, Colo.

Filed May 15, 1975, Ser. No. 571,508

Int. Cl.² H01H *13/08*

U.S. Cl. 200—157 **14 Claims**



1. Apparatus for providing an interface between an electro-surgical electrode and an electro-surgical generator which apparatus is manually manipulable as a surgical instrument comprising:

an electrically insulating housing having generally rectangular cross-section formed by a pair of elongated substantially flat rigid surfaces between a pair of sidewalls with narrow cross-sectional dimensions relative to said flat rigid surfaces, one of said flat rigid surfaces having at least one bore extending therethrough in proximity to one end of said housing and each said bore being outwardly encircled by an upright cylindrical wall terminating in inwardly turned shoulders,

means at one end of said housing for receiving a shank of an electro-surgical electrode,

at least one pair of electrical contact points arranged internally to said housing in underlying relation to said bore,

a momentary switch assembly including a hollow peripheral sidewall, a flexible cap enclosing one end of said peripheral sidewall and electrical circuit completing means, said peripheral sidewall being retained in sealing engagement internal to said housing bore and said upright cylindrical wall, said cap having a cross-section which is outwardly arcuate relative to the exterior of said housing for permitting inward coaxial movement thereof without imparting inward collapsing forces to said peripheral sidewall, said electrical circuit completing means being responsive to movement of said cap in inward coaxial relation to said peripheral wall for completing electrical contact between said pair of electrical contact points, said flexible cap having sufficient material memory for withdrawing said electrical circuit completing means from said pair of electrical contact points in the absence of application of an inward axial force thereto, and

means extending longitudinally through said housing from the other end thereof for coupling the electro-surgical generator with said shank receiving means and said pair of electrical contact points for establishing operational electrical communication therebetween, whereby said housing is manually usable with the feel of a passive surgical instrument while permitting manual selection of electro-surgical functions.

4,032,739
SUPPORTING STRUCTURE FOR LEAF SPRING CONTACT ASSEMBLY

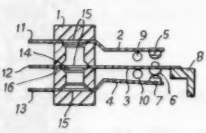
Holger Nicolaisen, and Finn Schnoor Andersen, both of Nordborg, Denmark, assignors to Danfoss A/S, Nordborg, Denmark

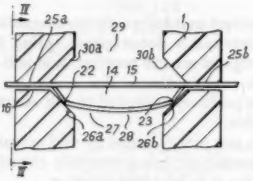
Filed Oct. 9, 1975, Ser. No. 620,872

Claims priority, application Germany, Oct. 28, 1974, 2451135

Int. Cl.² H01H *1/26*

U.S. Cl. 200—283 **3 Claims**





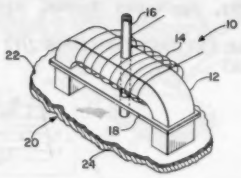
1. A contact switch assembly comprising an insulated contact carrier having a U-shaped portion with spaced apart walls, a slot extending transversely through said walls, mutually facing recesses formed in said walls on at least one side of said slot, said recesses having oppositely inclined surfaces, a leaf spring contact in said slot having an attached resiliently hinged flap extending at an acute angle relative to the plane of said leaf spring contact, said flap having sharp corners at opposite ends thereof which dig into said inclined surfaces of

said recesses to hold said flap in resilient biasing engagement with said inclined surfaces of said carrier to hold said leaf spring contact firmly in an inserted position.

4,032,740
TWO-LEVEL TEMPERATURE CONTROL FOR INDUCTION HEATING

Eugene Mittelmann, Chicago, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Apr. 7, 1975, Ser. No. 566,003
Int. Cl.² H05B 5/04
U.S. Cl. 219—10.77 **11 Claims**

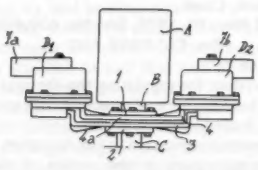


1. An induction heating and temperature responsive control apparatus in combination including an inverter circuit, an induction core unit, including a generally U-shaped ferromagnetic core with an exciter winding wrapped thereabout and in operative connection with the inverter circuit and means integrated with the core to monitor the surface temperature of a workpiece as it is heated by virtue of the magnetic circuit formed with the workpiece by the core, further including means responsive to the temperature, monitoring means for automatically controlling the output of the inverter so as to stop the supply of temperature inducing current to the core at a predetermined surface temperature of the workpiece, said means controlling the output including means for automatically and successively controlling the inverter to maintain a first predetermined temperature for a predetermined time period followed by a subsequent period of operation to increase the temperature to a second temperature level and maintain said second temperature level.

4,032,741
REAMING DEVICE FOR MACHINING BY ELECTRO-EROSION

Pierre Braudeau, Paris, and Alfred Marié Aime Maillet, Versailles, both of France, assignors to Carel Fouche Languepin, Paris, France

Continuation-in-part of Ser. No. 546,885, Feb. 4, 1975, abandoned. This application Apr. 1, 1976, Ser. No. 672,615
Claims priority, application France, Feb. 13, 1974, 74.04869
Int. Cl.² B23P 1/08
U.S. Cl. 219—69 V **4 Claims**

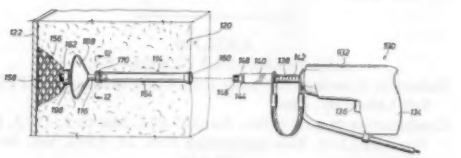


1. A reaming device for an electro-erosion machine, said machine comprising a machining head to control the advance of an electrode by means of a spindle toward a workpiece, said device having means to impart, in planes perpendicular to the direction of said advance, a reciprocal orbital movement according to a lateral circular translational motion of adjustable radius of curvature to two respective members relative to each other, one of said members being moved and the other remaining laterally stationary, said two members comprising a support member of the electrode and a support member of the workpiece, said device comprising at least two mechanisms which are synchronous and have the same orientation, one of them at least being moved by a motor, each of said mechanisms comprising a frame rigidly secured to said stationary support member and an eccentric pivot rotatably mounted in a bearing of said moving support member so as to form therewith a crank-rod assembly, the crank arm length of all those mechanisms being the same, each of said mechanisms being further provided with respective control means responsive to a common signal of pulses transmited and applied by electromagnetic means to synchronously vary said crank arm length, thereby to adjust the radius of curvature without having to stop the machine.

4,032,742
STUD WELDING GUN AND METHOD OF OPERATION

Gary R. Kendrick, and Robert A. Sauder, both of Emporia, Kans., assignors to Sauder Industries, Inc., Emporia, Kans.

Continuation-in-part of Ser. No. 484,624, July 1, 1974, abandoned. This application Sept. 24, 1975, Ser. No. 616,187
Int. Cl.² B23K 9/20
U.S. Cl. 219—99 **28 Claims**



1. Apparatus for attaching to a relatively stationary object a stud assembly having a relatively fixed portion and a movable portion movable between a first position and a second position, said apparatus comprising:

welding terminal means for conducting an electrical current through a stud assembly having a relatively fixed portion and a movable portion movable between a first and a second position, said welding terminal means being operable to weld the relatively fixed portion of the stud assembly to a stationary object;

engagement means defined by said welding terminal means for engaging the movable portion of the stud assembly;

displacement means for displacing said engagement means when said engagement means engages the movable portion of the stud assembly to move the movable portion of the stud assembly from the first position to the second position;

torque control means for controlling a torque imposed on the stud assembly by said engagement means when said displacement means displaces said engagement means; and

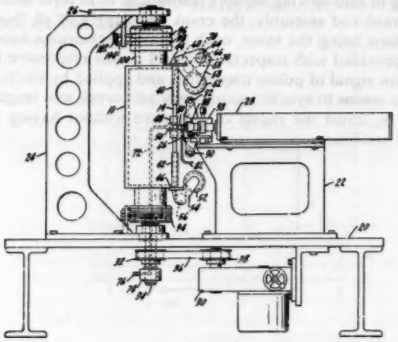
force control means for controlling a normal force imposed on the stud assembly by said engagement means when said engagement means engages the movable portion of the stud assembly.

4,032,743

LASER MICROPERFORATOR

Arthur R. Erbach, Des Plaines; Allen R. Franck, Glen Ellyn; Dennis L. Mulee, and Wilhelm E. Schmitt, both of Schaumburg, all of Ill., assignors to Marvel Engineering Company, Chicago, Ill.

Filed June 27, 1975, Ser. No. 590,868
Int. Cl.² B23K 26/00
U.S. Cl. 219—121 LM 17 Claims



1. A method of forming rows and columns of closely spaced micron sized holes in thin foil strips including the steps of:

positioning a plurality of foil strips in lengthwise in a direction parallel to the axis of and along the periphery of a continuously rotating generally cylindrical member,

intermittently activating a plurality of stationary lasers positioned adjacent said cylindrical member as it and the foil strips rotate,

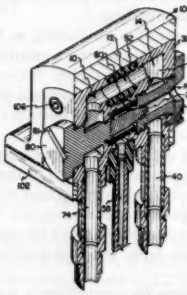
periodically moving the foil strips in a direction parallel to the cylindrical member axis between periods that the lasers are active to effect the formation of holes in said foil strips.

4,032,744

GAS STABILIZED PLASMA GUN

Robert G. Coucher, Salt Lake City, Utah, assignor to EPPCO, Salt Lake City, Utah

Continuation-in-part of Ser. No. 337,005, March 1, 1973, Pat. No. 3,851,140. This application Nov. 20, 1974, Ser. No. 525,341
Int. Cl.² B23K 9/00
U.S. Cl. 219—121 P 4 Claims



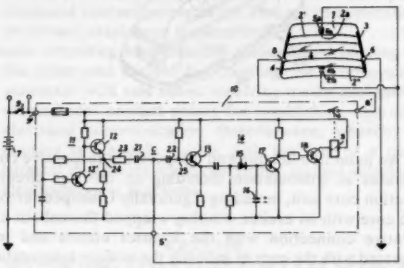
4. A method for cooling a cathode in a plasma producing device having a gas distribution ring circumscribing said cathode for introducing a plasma producing gas into said plasma producing device whereby a major portion of said plasma producing gas is introduced as a linear flow component and a minor portion is introduced as a helical flow component circumscribing said linear flow component, comprising introducing a liquid coolant into said plasma producing device to cool said cathode in a manner such that the tip of said cathode is just below its melting temperature, the mid or center section of said cathode is at or near its oxidation temperature and the base of the cathode is below its oxidation temperature.

4,032,745

CONTROL SYSTEM FOR VEHICLE WINDOW HEATER

Sergio Roselli, Pisa, Italy, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed Apr. 17, 1975, Ser. No. 568,997
Claims priority, application France, Apr. 19, 1974, 74.13650
Int. Cl.² H05B 1/02; E06B 7/12
U.S. Cl. 219—203 7 Claims



1. Apparatus for heating a vehicle window comprising a heating grid for said window, a switch for connection of said grid to a source of electrical energy, an oscillator and a signal detector, a signal circuit for coupling the output of said oscillator to the input of said signal detector, said signal circuit having a DC voltage component at at least one point thereof, a humidity detector having a pair of spaced apart conductors disposed on the window, one of said conductors being connected directly to a point of said heating grid which is at different DC voltages when said switch is opened and closed respectively, coupling means for AC coupling the other conductor of said pair to said signal circuit to control the amplitude of oscillations supplied from said oscillator to said signal detector in response to variation of the impedance between said conductors, said coupling means including capacitor means for providing DC isolation between said humidity detector and any DC voltage component in said signal circuit, and means responsive to the output of said signal detector for actuating said switch.

4,032,746

CONTROL SYSTEM FOR A FUSING APPARATUS

Howard J. Barsell, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

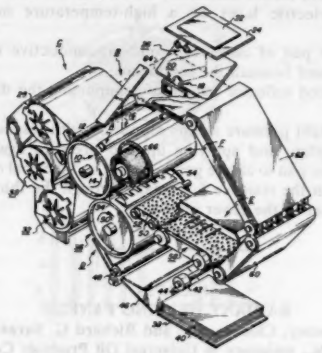
Filed Nov. 10, 1975, Ser. No. 630,470
Int. Cl.² H05B 1/02
U.S. Cl. 219—216 10 Claims

1. A control system for regulating the thermal energy produced by a first heat source and a second heat source cooperating therewith, including:

first control means, responsive to the deviation between the measured temperature in the region of the first heat source and a pre-selected temperature reference, for regulating the phase of the voltage applied to the first heat source and second heat source maintaining the RMS voltage applied thereto substantially at a pre-selected level; and

second control means, responsive to the deviation between the measured temperature in the region of the first heat source and the measured temperature in the region on the

second heat source, for regulating the phase of the voltage applied to the first heat source and second heat



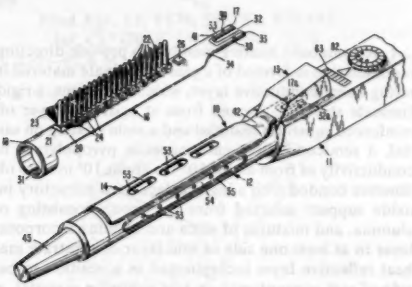
source maintaining the RMS voltage applied thereto substantially at a pre-selected level.

4,032,747

THERMAL HAIR STYLING APPLIANCE HAVING INTERCHANGEABLE ATTACHMENTS

Raymond W. Kunz, Monroe, Conn., assignor to Clairol Incorporated, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,323
Int. Cl.² H05B *1/02*; A45D *1/04*, *2/36*; B25G *3/18*
U.S. Cl. 219—222 11 Claims



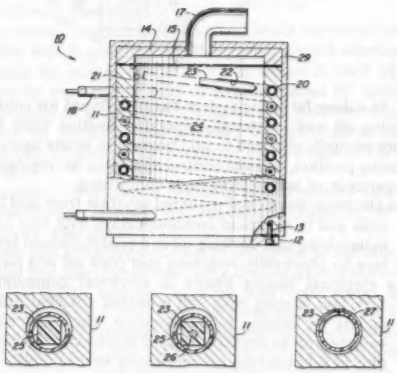
1. A hair treating device comprising:
a tubular barrel extending along an axis, said tubular barrel having first and second ends and defining a heating chamber therein;
heating means disposed in said tubular barrel;
vapor generating means disposed in said tubular barrel and energized by said heating means;
a hair treating section of said tubular barrel along which heat and vapor are transmitted to the hair;
a housing attached to said first end of the tubular barrel, said housing forming a handle;
a readily detachable hair styling attachment cooperating with said tubular barrel in styling the hair, said attachment including a longitudinally extending open slot in one end thereof and a pair of notches disposed adjacent said one end of the attachment;
an operating button;
means for mounting said operating button in said handle and adjacent to the first end of said tubular barrel, said mounting means mounting said operating button to both slide and pivot relative to said handle and said tubular barrel; and
coupling means included in said operating button for detachably securing said attachment thereto, wherein the coupling means includes:
a land within said button;
at least one projecting means extending from the land toward the tubular barrel, said projecting means including an enlarged head portion spaced from said land a distance greater than the thickness of the attachment; and
a leaf spring retained on said projecting means by said head portion, wherein said leaf spring includes a pair of detents having oppositely sloping ramps which converge to an apex, and wherein said attachment is held between the leaf spring and the land with the projecting means received in the slot of the attachment and the apexes of the detents received in the notches of the attachment in order to detachably couple the attachment to the button, so that the attachment may be removed from the button by pulling the attachment away from the button and coupled to the button by pushing the attachment toward the button.

4,032,748

SCALE DEPOSIT REMOVAL ARRANGEMENT FOR ELECTRIC WATER HEATERS AND VAPORIZERS

William Vischer, Palatine; Orest A. Kozinczuk, Chicago, and Robert J. Shulz, Brookfield, all of Ill., assignors to Innovative Process Equipment, Inc., Palatine, Ill.

Filed Oct. 10, 1975, Ser. No. 621,304
Int. Cl.² F24H *1/16*; F22B *1/28*; F28G *5/00*
U.S. Cl. 219—275 10 Claims



1. A heat exchanger for heating water containing dissolved solids, comprising in combination
metallic heat transfer means having a guide passageway therethrough,
means for heating said heat transfer means,
a plastic tube having a coefficient of thermal expansion substantially greater than that of said heat transfer means,
said tube having a water inlet at one end and a fluid outlet at the other end,
said tube being coaxially disposed within said passageway in heat transfer relationship therewith,
said tube being sufficiently smaller in external cross-section than the internal cross-section of said passageway and being movable in said passageway with at least one end of said tube extending freely from one end of said passageway so that said tube may expand independently of said heat transfer means in both length and cross-sectional area,
whereby expansion and contraction of said tube dislodges salt crystals deposited on the interior wall thereof.

4,032,749

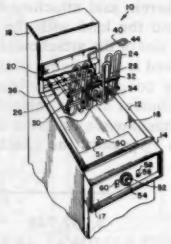
FRYING APPARATUS WITH COMPENSATED THERMOSTAT

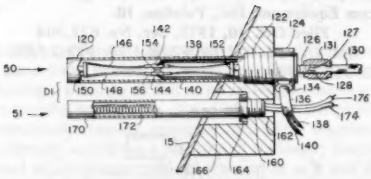
George M. Price, Shreveport, La., assignor to The Frymaster Corporation, Shreveport, La.

Division of Ser. No. 465,918, May 1, 1974, Pat. No. 3,911,250. This application Aug. 8, 1975, Ser. No. 603,009

Int. Cl.² F27D *11/02*

U.S. Cl. 219—442 **5 Claims**





1. In a deep fat frying system having a frypot for containing cooking oil and electrically operated heating coils in said frypot pivotally attached to said housing to rotate upward to a cleaning position, thermal control apparatus for regulating the temperature of said heating coils comprising:

an electrical thermostat mounted separate from said heating coils and in electrical communication with said coils for maintaining said cooking oil at a predetermined temperature by alternately switching said coils off and on, and

an electrical biasing heater in electrical communication with said heating coils and mounted adjacent said thermostat for heating said thermostat when said coils are switched on to simulate to said thermostat the temperature of said cooking oil contiguous to said coils.

4,032,750

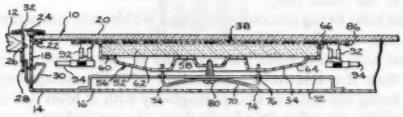
FLAT PLATE HEATING UNIT WITH FOIL HEATING MEANS

Bohdan Hurko, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Mar. 26, 1976, Ser. No. 670,702

Int. Cl.² H05B *3/68*

U.S. Cl. 219—464 **9 Claims**



1. A flat plate surface heating unit comprising:

an upper utensil-supporting cover plate of heat-conductive material;

a thin flexible layer of dielectric heat-conductive material positioned against the underside of the cover plate but not bonded thereto;

resistive foil means adhesively bonded to the underside of the dielectric layer by a high-temperature inorganic binder;

a support pad of dielectric non-heat-conductive material positioned beneath the foil means;

a reinforced reflector pan firmly supporting the dielectric pad;

and constant pressure means supported with respect to the cover plate and applying upward pressure against the reflector pan to assure good contact and thermal coupling between the resistive foil means through the thin dielectric layer to the cover plate.

4,032,751

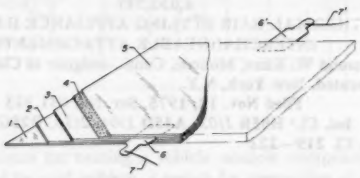
RADIANT HEATING PANEL

Karl J. Youtsey, Chicago, Ill., and Richard G. Sarazin, Onalaska, Wis., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Apr. 21, 1975, Ser. No. 569,898

Int. Cl.² H05B *3/02*

U.S. Cl. 219—538 **8 Claims**



1. A composite heating member to provide directional heat radiation that is formed of a plastic laminate material incorporating a semiconductive layer, which comprises, a rigid plastic laminate structure formed from at least one layer of matrix reinforced substrate material and a resin coating on said material, a semiconductive carbonaceous pyropolymer having a conductivity of from about 10^{-8} to about 10^{2} inverse ohm-centimeters bonded with a high surface area refractory inorganic oxide support selected from the group consisting of silica, alumina, and mixtures of silica and alumina incorporated as a layer to at least one side of said layer of substrate material, a heat reflective layer incorporated in a position to be to one side of said pyropolymer on said substrate material, and current supply means to spaced apart portions of said layer of conductive carbonaceous pyropolymer to provide electrical resistance heating therein which will be subject to reflection and radiation by said heat reflective layer of the composite member.

4,032,752

HEATING ELEMENTS COMPRISING A PTC CERAMIC ARTICLE OF A HONEYCOMB STRUCTURE COMPOSED OF BARIUM TITANATE

Akira Ohmura, Nagoya, and Shigetaka Wada, Kuwana, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Aug. 23, 1976, Ser. No. 716,713

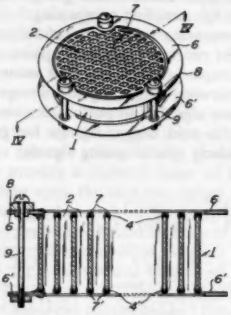
Claims priority, application Japan, Sept. 3, 1975, 50-106033

Int. Cl.² H05B *3/08*

U.S. Cl. 219—541 **11 Claims**

1. A heating element comprising a ceramic article of a honeycomb structure having a positive temperature coefficient of electrical resistance and composed of barium titanate in which a pair of ohmic electrodes consisting mainly of silver as a metallic component and having a surface resistivity of the electrode per se of not more than 10 $m\Omega/cm^2$ are provided on

both end surfaces of the ceramic article of the honeycomb structure provided with a multiplicity of parallel channels



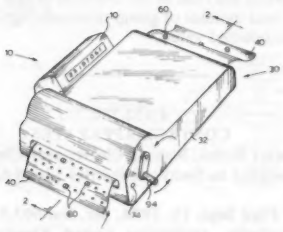
extending therethrough and an electrically insulating and thermostable coating is applied on said ohmic electrodes.

4,032,753

PROGRAMMING APPARATUS

Stanley J. Lieberman, 1560 Glencoe Road, Winter Park, Fla. 32789

Filed Apr. 19, 1976, Ser. No. 678,182
Int. Cl.² G06K *15/18, 7/04, 19/06*
U.S. Cl. 235—61.6 M **12 Claims**



1. An apparatus for programming a hand-held, electronic calculator of the type having depressible-key numerical and programming inputs, said programming apparatus comprising in combination:

tape storage means having a matrix of rows and columns thereon;

command means for coupling to said tape storage means at an intersection of one of said rows and said columns, thereby storing a particular programming command thereon;

actuator means coupled between said tape storage means and said depressible keys of said calculator for actuating said depressible keys responsive to said command means;

a frame for receiving therein said calculator and for providing registration between said tape storage means, said command means, said actuator means and said depressible keys; and

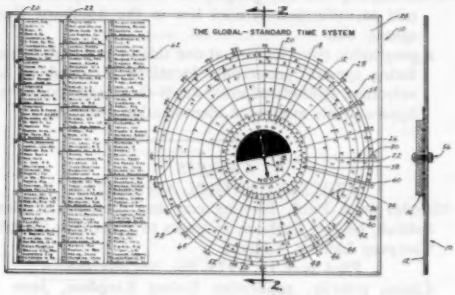
motive means coupled to said frame for moving said tape storage means, and said command means coupled thereto, relative to said actuator means for sequentially actuating said depressible keys, whereby said electronic calculator is programmed.

4,032,754

GLOBAL TIME SYSTEM

Roy R. Ageton, Conrad, Iowa 50621

Filed Feb. 23, 1976, Ser. No. 660,373
Int. Cl.² G06C *27/00*
U.S. Cl. 235—78 R **1 Claim**



1. A global time system for determining the time at one location on the earth with respect to another location on the earth where the time is known, consisting of:

first disc divided into twenty-four equal sections by twenty-four lines radially extending from the center of said first disc, said lines representing lines of longitude spaced 15° apart, each of said twenty-four sections representing a different time zone;

nine circles concentrically disposed about the center of said first disc in progressively decreasing spaced relationship from the center of said first disc outward, each of said circles representing lines of latitude spaced 10° apart;

a plurality of geographic spaces formed between adjacent line of longitude and latitude, said geographic spaces having a width of 15° longitude and a length of 10° latitude;

a plurality of longitude numbers spaced around said first disc and indicating the respective longitudes of said twenty-four lines;

a time disc rotatably mounted at the center to the center of said first disc, the outside edge thereof having twent-four hour marks thereon, each of said hour marks being equally spaced from each adjacent mark, the marks on each half of said time disc being consecutively numbered from one to twelve for designating the twenty-four hours of the day, said time disc further having twenty-four half-hour marks centered between adjacent hour marks;

a pair of oppositely opposed arrows extending outwardly from the center of said time disc and dividing said time disc in half, one half representing A.M. hours and the other half representing P.M. hours;

said time disc having a darkened portion, one edge of which passes through the center of said time disc and extends perpendicular to said arrows, said darkened portion representing nighttime hours;

said time disc having a lightened portion opposite from said darkened portion and representing daylight hours;

means for rotatably mounting said time disc to said first disc;

twenty-four reference symbols located on said first disc adjacent to the outside edge of said time disc, one of said reference symbols being located in each of said twenty-four sections;

Consecutively numbered identification symbols within each of said twenty-four sections, each identification symbol representing a specific geographic location on the earth within the time zone represented by said section and disposed within said geographic space according to the

actual longitude and latitude of the specific geographic location;

a forward dot located in front of said identification symbol for indicating that the geographic location represented by said identification symbol lies in the Northern Hemisphere;

a rearward dot located behind said identification symbol for indicating that the geographic location represented by said identification symbol lies in the Southern Hemisphere; and

a geographic chart located at one side of said first disc and listing specific geographic locations arranged by said reference symbols of said twenty-four sections and said consecutively numbered identification symbols.

4,032,755
PROCESS CONTROL APPARATUS

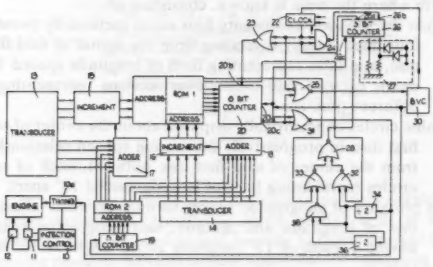
Nicholas John Bard, Birmingham, and Malcolm Williams, Solihull, both of England, assignors to The Lucas Electrical Company Limited, England

Filed June 16, 1975, Ser. No. 586,968

Claims priority, application United Kingdom, June 18, 1974, 26870/74

Int. Cl.² H03K *21/30*

U.S. Cl. 235—92 CC **4 Claims**



1. Process control apparatus for producing a pulse length modulated output, modulated in accordance with two different input parammeters, and comprising a digital memory unit which produces an *n*-bit digital output signal dependent upon two independent digital input signals, an *m*-bit digital programme counter (where *m* is less than *n*) that is clocked cyclically and programmable by the *m* most significant bits of the digital output signal of the digital memory unit, a clock pulse source, a gate controlling admission of clock pulses cyclically to the counter, a delay circuit connected to control said gate and a sampling circuit connected to the *n* - *m* least significant bit or bits of the memory unit to vary the delay introduced by said delay circuit in accordance with said least significant bit or bits during alternate cycles of the counter, the output pulse length being determined by the sum of said delay and the time taken to clock the counter from the count programmed by the *m* most significant bits to a predetermined count.

4,032,756
TACAN-DME IDENTITY DETECTOR

Maurice Leon Jean Jezo, Cedar Grove, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Aug. 14, 1975, Ser. No. 604,759

Int. Cl.² G01S *1/44*; H03K *21/36*

U.S. Cl. 235—92 PB **11 Claims**

1. An apparatus for extracting identity information from a Tacan signal wherein said identity information consists of marks and spaces and wherein said Tacan signal includes group reference signals, said marks comprising a predetermined number of adjacent group reference signals having therebetween a plurality of regularly spaced Tacan pulse pairs comprising:

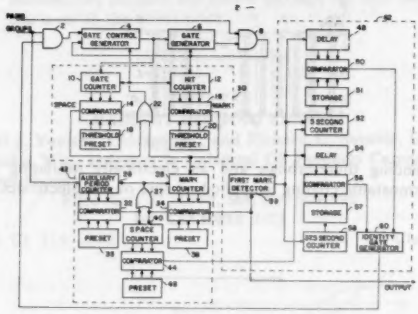
means for sampling said Tacan signal at predetermined sample intervals after each of said group reference signals, said means for sampling comprising:

first means for receiving said group reference signals;

second means for receiving said pulse pairs;

trigger means coupled to said first and second receiving means for generating trigger signals in response to said group reference signals and pulse pairs; and

means responsive to said trigger signals for generating a plurality of regularly spaced gating signals;



means for indicating a hit when one of said regularly spaced pulse pairs is present during said sample interval;

a mark counter;

means for incrementing said mark counter when the ratio of hits to sample intervals between adjacent group reference signals equals a preselected value; and

means for declaring a mark when the ratio of the contents of said mark counter to the total number of group reference signals equals a preselected value and for declaring a space when the ratio of the contents of said mark counter to the total number of group reference signals is less than said preselected value.

4,032,757
CONTROL APPARATUS

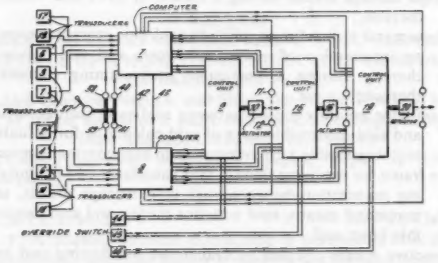
Edward Stuart Eccles, Bishops Cleeve, near Cheltenham, England, assignor to Smiths Industries Limited, London, England

Filed Sept. 19, 1974, Ser. No. 507,514

Claims priority, application United Kingdom, Sept. 24, 1973, 44636/73

Int. Cl.³ G06F *15/46*, *11/08*

U.S. Cl. 235—150.2 **8 Claims**



1. Control apparatus comprising:

two inter-connected control lanes for providing nominally-identical outputs for control of an output parameter, each

said control lane comprising computer means for deriving the control output of the subject lane,

means for supplying a first signal in accordance with an input parameter to the said computer means,

and means for supplying a second signal in accordance with a demanded value of said output parameter to said computer means,

said computer means being programmed to perform a control program in which the value of the said first signal supplied in the subject lane is compared with the value of the said first signal supplied in the other lane to determine whether the two values are in accord with one another and to provide a derived value of the input parameter dependent upon the said two values if they are in accord with one another and otherwise to provide said derived value as the value of said first signal supplied in the subject lane, and said control program including computation of the said control output of the subject lane in dependence upon difference between the said derived value of the input parameter and the value corresponding to said second signal supplied to the computing means;

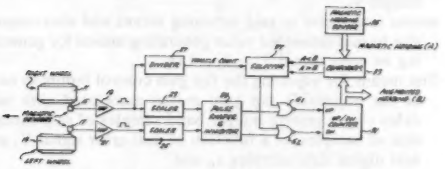
and means for detecting discrepancy between the control outputs of the two lanes to provide manifestation thereof.

4,032,758

COMPENSATED VEHICLE HEADING SYSTEM

Richard W. Lewis, Derby, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 5, 1975, Ser. No. 629,119
Int. Cl.² G06F *15/50*; B62D *5/00*
U.S. Cl. 235—150.2 **16 Claims**



1. A compensated vehicle heading system for use with a land vehicle including at least one undriven wheel, said compensated vehicle heading system comprising:

a magnetic heading sensor for magnetically sensing the heading of a vehicle and generating a first heading signal in accordance therewith;

a vehicle dynamic heading sensor for sensing changes in the direction of a vehicle by sensing the dynamic movement of the vehicle and generating a second heading signal in accordance therewith, said vehicle dynamic heading sensor including a first rotation sensing means for sensing the rotation of said at least one undriven wheel;

comparison means connected so as to receive said first and second heading signals for comparing said first and second heading signals and generating an output denoting whether or not said signals are different, and, if so, which signal is greater; and,

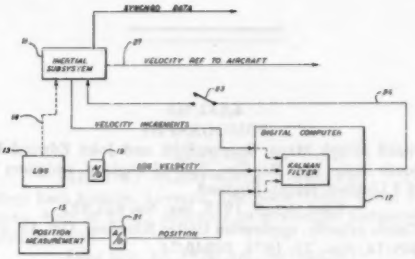
control means connected to said comparison means and to said vehicle dynamic heading sensor for increasing or decreasing the magnitude of said second heading signal in accordance with the output of said comparison means so as to move said second heading signal toward said first heading signal.

4,032,759

SHIPBOARD REFERENCE FOR AN AIRCRAFT NAVIGATION SYSTEM

Boris Danik, North Caldwell, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed Oct. 24, 1975, Ser. No. 625,429
Int. Cl.³ G06F *15/50*
U.S. Cl. 235—150.25 **10 Claims**



1. A method of rapidly aligning aircraft inertial platforms installed in aircraft located aboard an aircraft carrier which changes its location with time, said aircraft carrier thereby having a state vector containing as elements at least the velocity of said aircraft carrier and its position, comprising the steps of:

a. installing a low-accuracy aircraft type inertial reference system on the aircraft carrier, said system including an inertial subsystem and a Kalman filter, said inertial subsystem providing as outputs quantities representing the velocity of the aircraft carrier,

b. installing means on the aircraft carrier providing updating information regarding the state vector of the aircraft carrier to said Kalman filter;

c. providing as a velocity reference to the aircraft the velocity outputs of the inertial subsystem of said inertial reference system;

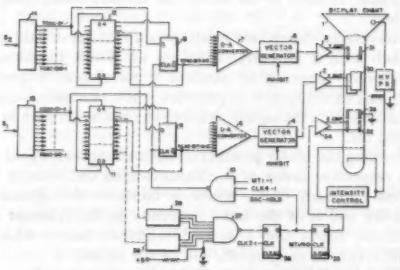
d. updating said inertial subsystem of said inertial reference system from said Kalman filter at intervals of the order of magnitude of two hours and never while providing a velocity reference to an aircraft.

4,032,760

PHOSPHOR PROTECTION FOR X-Y LOOPS

William T. Quarton, and Peter R. Lowe, both of Englewood, Colo., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 22, 1975, Ser. No. 624,905
Int. Cl.² G06G *7/28*; G06F *3/14*
U.S. Cl. 235—151 **11 Claims**



1. Apparatus selectively responsive to successive digital representations of changing data values including means to compare the digital representation of a data value with the digital representation of a preceding data value to produce a digital output signal representative of the incremental differ-

ence between said data values, and means responsive to said incremental difference signal to inhibit the response of said apparatus to those data values when said incremental difference is less than a predetermined value and to restore said response of said apparatus to said data values when the cumulative value of said incremental difference is equal to or greater than said predetermined value.

4,032,761
TOMOGRAPHY

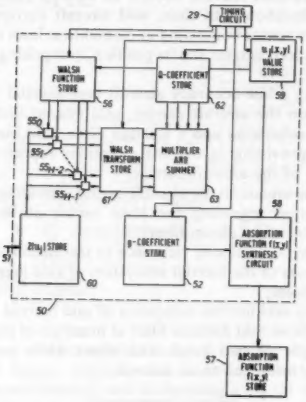
Bernard Joseph Mayo, Beaconsfield, and John Edward Best, South Stoke, near Reading, both of England, assignors to E M I Limited, Hayes, England

Filed Oct. 9, 1975, Ser. No. 621,027

Claims priority, application United Kingdom, Oct. 11, 1974, 44049/74; Nov. 23, 1974, 50840/74

Int. Cl.² G03B 41/16

U.S. Cl. 235—151.3 **1 Claim**



1. A method of operating on electrical signals, each indicative of a line integral of absorption suffered by penetrating radiation, on traversing a respective beam path through a slice disposed cross-sectionally of a body under examination so as to produce a representation of the absorption coefficient, with respect to said radiation, at each of a plurality of locations distributed over said slice; the beam paths comprising a set of substantially parallel paths at each of a plurality of angular orientations relative to the body; the method comprising the steps of:

a. convolving the signals relating to a first set of said paths each with a plurality of values of Walsh functions of different sequency to produce a plurality of convolved signals of respective sequencies, each containing contributions from the signals relating to each beam path in said first set.

b. forming the scalar product of each convolved signal with a respective series of coefficients each determined by a first sequency factor which is constant throughout the series and is of the same sequency as the relevant convolved signal and a second sequency factor which is different for each coefficient of the series,

c. storing said scalar products in a coefficient store,

d. repeating the method steps (a), (b) and (c) for the signals relating to the other sets of beam paths, and

e. inverting the products stored in said coefficient store in dependence upon respective values of Walsh transform functions to evaluate said absorption coefficients.

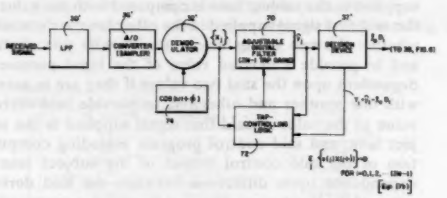
4,032,762
ADJUSTABLE DIGITAL FILTER FOR HIGH SPEED DIGITAL TRANSMISSION SYSTEM

Michael A. Caloyannides, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 7, 1975, Ser. No. 620,532

Int. Cl.² H04B 1/10, 3/04

U.S. Cl. 235—152 **30 Claims**



1. An adjustable digital filter for use in a digital data transmission and receiving system for digitally filtering and equalizing a received data signal supplied to the filter as digital data samples x_j at twice the baud rate of data transmission and including successive, alternating integer-baud and half-baud samples, comprising:

a plurality of successive delay stages for storing successive said digital data samples,

a corresponding plurality of adjustable tap gain means respectively associated with said plurality of delay stages, each receiving the samples currently stored in the respectively associated delay stages and a corresponding tap gain control as inputs thereto, and producing as an output thereof the product of the inputs thereto,

meas for summing the outputs of said tap gain means and producing a filtered and equalized output sample y_j in each baud interval for the corresponding integer baud sample x_j,

means responsive to each sample y_j for generating a corresponding estimated value l_eD_j representing an estimate of the value of a correctly equalized and filtered output sample y_j,

means responsive to said summing means and also responsive to said estimated value generating means for generating an error signal $Y_j = Y_j - l_eD_j$,

first means for adjusting the tap gain control inputs to each of the adjustable tap gain means associated with said delay stages storing integer baud samples of said succession of samples, as a function of said error signal Y_j and said digital data samples x_j, and

second means for adjusting the tap gain control inputs to each adjustable tap gain means associated with a delay stage storing half-integer baud samples of said succession of samples as a function of the adjustment by said first adjusting means to the tap gain control input to the adjustable tap gain means associated with at least one integer baud sample storing delay stage respectively corresponding thereto.

4,032,763
PRODUCTION OF PSEUDO-RANDOM BINARY SIGNAL SEQUENCES

Ekkehard Glitz, Backnang, Germany, assignor to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Germany

Filed Oct. 30, 1975, Ser. No. 627,312

Claims priority, application Germany, Oct. 31, 1974, 2451711

Int. Cl.² G06F 1/00

U.S. Cl. 235—152 **19 Claims**

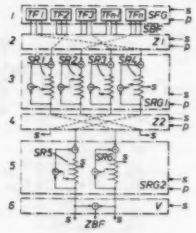
1. Method for producing a pseudo-random binary signal sequence having a long period duration utilizing at least one feedback-connected shift register having an original sequence of operation which is influenced by a first binary signal se-

quence fed into the shift register in a manner to interfere with the original sequence of operation, comprising the steps of:

producing a plurality of such first binary signal sequences and causing such sequences to differ from one another;

feeding a selected one of the binary signal sequences as an operating sequence interfering signal to at least one input of the shift register by means of an electronically controllable associator circuit receiving the binary signal sequences and connected to at least one input of the shift register; and

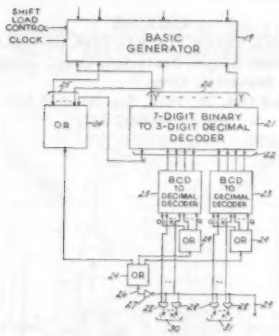
varying the connections effected by the associator circuit by at least one of: a setting program signal; and a control signal derived from binary signal sequences produced during the production of the psuedo-random sequence.



4,032,764
MEANS AND METHOD FOR GENERATING PERMUTATIONS OF A SQUARE

John E. Savage, 65 Humboldt Ave., Providence, R.I. 02906

Filed Dec. 1, 1975, Ser. No. 636,810
Int. Cl.² G06F 1/02; G07C 15/00
U.S. Cl. 235—152 2 Claims

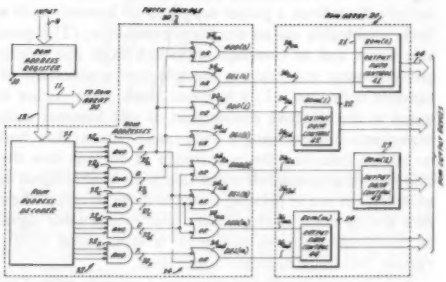


1. A device for generating permutations of a square having k^2 subsquares by generating values of the pairs (i,j) where both i and j are greater than or equal to 1 and equal to or less than k, comprising: a basic generator including a maximal length shift-register having a series of inputs corresponding to the characteristic polynomial $h(x) = x^n + h_{n-1}x^{n-1} + h_{n-2}x^{n-2} + \ldots + h_1 x + h_0$, said register having the properties that when initialized with any binary n-tuple other than 0 it will cycle through 2^n-1 different states before returning to said n-tuple; a binary to decimal decoder having at least a 7 digit binary input recieivng the output of said maximal length shift-register, and at least a 3 digit decimal output in binary coded decimal form; first and second binary coded decimal to decimal decoders receiving the output of 2 of said 3 digit output, a first OR gate receiving the output of the remaining third and other of said at least 3 digit output; and second and third OR gates receiving the outputs, respectively, from said first and second binary coded decimal to decimal decoders, a fourth OR gate receiving the output of said first, second and third OR gates such that the output of the same is zero only when all inputs to said second and third OR gates are zero; and a plurality of AND gates sensing the output of said fourth OR gate and outputs of both of said first and second binary to decimal decoders; said AND gates having a 1 output denoting an integer between 1 and k.

4,032,765
MEMORY MODIFICATION SYSTEM

Jeffrey Earl Epstein, Laverne, and Gary Victor Ruby, Pasadena, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed Feb. 23, 1976, Ser. No. 660,519
Int. Cl.² G11C 29/00; G06F 11/00
U.S. Cl. 235—153 AM 9 Claims



1. In a system for modifying the data output of the data in a specified bit-space of memory storage, the combination comprising:

a. a read only memory store of addressable data-bit locations;

b. means for recognition of address locations of data having contents which are desired to be modified;

c. means for providing an ADD bit or a DELETE bit control signal to the output data accessed from said address locations having contents to be modified, said means for providing a control signal being activated by said means for recognition upon detection of an address involving a data-bit location whose data content is to be modified;

d. an Output-data Control Circuit for receiving control signals from said means and ADD bit or a DELETE bit signal, said Output-data Control Circuit including:

d1. an input line carrying data derived from a selected bit-space of said memory store;

d2. logic modifying means on said input line capable of modifying the data-bit derived from said bit-space;

d3. said logic means being responsive to a control signal from said means for providing an ADD or DELETE bit control signal;

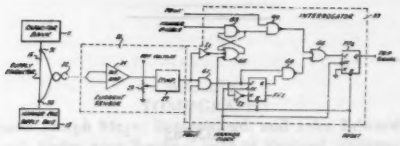
e. and wherein said Output-data Control Circuit provides a logic modifying means for each output line from each bit location in memory which may be desired to be modified;

f. said means for recognition includes address lines wired to a plurality of AND gates, each of said AND gates wired for signal activation upon the presense of a specifically known address signal addressing a specified memory store location which is desired to be modified, whereby activation of a specified AND gate will initiate said means by providing a control signal.

4,032,766
WIDE RANGE CURRENT FLOW FAULT DETECTOR

Lee E. Hughes, Bellevue; John L. Marshall, Renton, and Dieter Doring, Seattle, all of Wash., assignors to Tally Corporation, Kent, Wash.

Filed May 17, 1976, Ser. No. 686,880
Int. Cl.² G06F 11/00; H02H 3/38
U.S. Cl. 235—153 AS 16 Claims



9. In a line printer wherein: (1) power suitable for energizing one or more selectively enableable hammer coils simultaneously flows from a power supply to all hammer coils selectively enableable via an electrical conductor; (2) a print enable signal and its complement switch from non printing to printing states just prior to the selective enablement of said hammer coils; and, (3) a hammer clock pulse occurs subsequent to the selective enablement of said hammer coils, the improvement comprising a wide range current flow fault detector for detecting the occurrence of current flow through said electrical conductor when said print enable signal and its complement are in printing states and the absence of current flow during other intervals when said print enable signal and its complement are in non printing states, said wide range current flow fault detector comprising:

A. a current sensor for receiving a current related voltage input and providing an output indicative of whether said current related voltage denotes a current above or below a predetermined minimum level, said current sensor including a two state output circuit having a pair of input terminals for receiving a voltage related to the magnitude of current flow through an electrical conductor, one of said states occurring when the voltage received by said pair of input terminals indicates that the magnitude of the current flow through said electrical conductor is above said predetermined minimum level and the other state occurring when the voltage received by said pair of input terminals indicates that the magnitude of the current flow through said electrical conductor is below said predetermined minimum level;

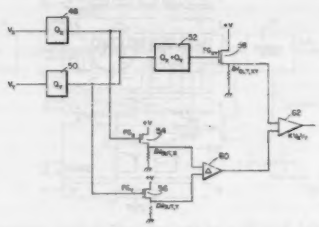
B. electrical connection means for connecting said pair of input terminals of said two state output circuit to spaced points lying along said electrical conductor; and,

C. an interrogator connected to the output of said current sensor for selectively interrogating the output of said current sensor, said interrogator producing a two state fault indicating output, one of said states being a no fault state denoting the presence of current flow through said electrical conductor above said predetermined minimum level when said point enable signal and its complement are in printing states or the absence of current flow above said predetermined minimum level and the other of said states being a fault state indicating the absence of current flow through said electrical conductor above said predetermined minimum level or the presence of current flow through said electrical conductor above said predetermined minimum level when said print enable signal and its complement are in non printing states.

4,032,767
HIGH-FREQUENCY CCD ADDER AND MULTIPLIER

Isaac Lagnado, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 26, 1976, Ser. No. 661,689
Int. Cl.² G06G 7/16; H03K 5/159
U.S. Cl. 364—862 13 Claims



11. A multiplier comprising:

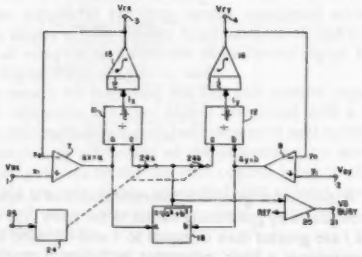
first means for receiving input voltages V_X and V_Y, for converting V_X and V_Y into charge quantities Q_X and Q_Y and for forming the sum $Q_X + Q_Y$; and

second means operably coupled to said first means for receiving said charge quantities Q_X, Q_Y and $Q_X + Q_Y$ and for forming the product $K V_X V_Y$ therefrom, where K is a constant.

4,032,768
CONSTANT VELOCITY VECTOR GENERATOR

Michael Lawrence Rieger, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 24, 1975, Ser. No. 625,609
Int. Cl.² G06G 7/22
U.S. Cl. 235—197 11 Claims



1. A system for converting a pair of substantially simultaneous step voltages to a pair of linear ramp voltages at a constant rate, comprising:

means for comparing said pair of step voltages to said ramp voltages and producing a pair of difference currents i_a and i_b therefrom;

means responsive to said difference currents for producing a current i_c which may be defined mathematically as $i_a^2 + i_b^2$;

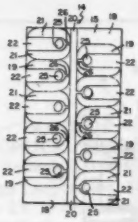
means for producing a pair of substantially constant currents which may be defined mathematically as i_a/i_c and i_b/i_c respectively; and

means for integrating said constant currents to product said ramp voltages.

4,032,769
PHOTOFLASH LAMP ARRAY WITH WEB HINGE

Donald W. Hartman; Donald E. Armstrong, and Emery G. Audesse, all of Williamsport, Pa., assignors to GTE Sylvania Incorporated, Montoursville, Pa.

Filed Aug. 21, 1975, Ser. No. 606,388
Int. Cl.² G03B *15/02*; F21V *7/00*
U.S. Cl. 240—1.3 **16 Claims**

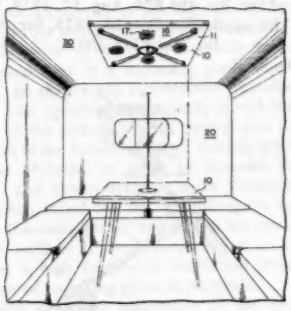


1. A multiple reflector system for a photo-flash lamp array comprising a pair of complementary strip-like thin-walled reflector panels each having a row of side-by-side cavities in its front side formed with reflecting surfaces defining individual lamp reflectors, and a channeled web joining said reflector panels and having two substantially parallel fold lines extending the length of said web, said channeled web providing a spring-hinged support for said reflector panels.

4,032,770
PORTABLE TABLE AND LAMP FIXTURE

Gloria Astrid Millette, Detroit, Mich., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Dec. 9, 1975, Ser. No. 639,215
Int. Cl.² F21V *33/00*; A47B *97/00*
U.S. Cl. 240—4 **2 Claims**



1. A combination light fixture and table assembly, which in a first position may be hung from a ceiling against the ceiling to serve as a source of illumination, and in a second position may be supported on foldable legs on a floor to serve both as a table and as a source of illumination, comprising

a table unit formed of a table top joined on its underside to foldable legs,

said table top fitted with a lamp unit that is fixed to the table top in a through opening in the said table top,

said lamp unit formed of

a top plate that is mounted to said table top in said opening so that the upper surface of the said top plate forms a continuation of the surface of the table top, and

a shell that extends below the lower surface of said table top, with said top plate and said shell enclosing an interior chamber in which an electric light bulb socket is fixed, with

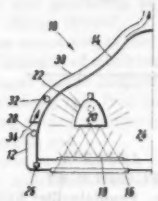
said top plate and said shell each formed of light transmitting material so that a light bulb mounted in the socket casts light above the table and below the table,

said socket connected to a flexible electric cable that extends through the said top plate, which cable serves as the means to suspend the assembly from a ceiling in said first position.

4,032,771
SURGICAL OPERATING LAMP

Karl F. Ilzig, Hanau, Germany, assignor to Original Hanau Quarzlampen GmbH, Hanau, Germany

Continuation of Ser. No. 435,796, Jan. 23, 1974. This application Apr. 24, 1975, Ser. No. 571,321
Claims priority, application Germany, Feb. 6, 1973, 2305664
Int. Cl.² A61G *13/00*
U.S. Cl. 240—1.4 **7 Claims**



1. In a suspended surgical lamp having a hollow annular lighting body including a transversely extending lower surface, a plurality of light sources within said lighting body facing said lower surface, said lighting body having transparent portions at positions aligned with respective light sources in its lower surface to allow passage of visible light from said sources, an individual first visible light reflector disposed about each of said light sources to reflect visible light rays towards said transparent portions of said lower surface and to transmit infrared radiation therethrough, second infrared reflectors which are transparent to visible light positioned between said light sources and said transparent portions to reflect infrared rays emanating from said light source away from said transparent portions, the improvement wherein said lighting body further comprises concentric inner and outer bell shaped members surrounding all of said light sources and facing said transverse lower surface, said inner bell shaped member being joined at its periphery to said annular lighting body to form with said transverse surface a closed chamber and absorbing infrared radiation from said first and second reflectors, said outer bell shaped member having upper and lower openings facing said inner bell shaped member and being spaced from said inner bell shaped member to form a chimney such that said lower opening allows air to enter between said inner and outer bell shaped members for convection flow upwardly therebetween by absorbing heat from said inner bell shaped member, for discharge from said upper opening to maintain said outer bell shaped member relatively cool.

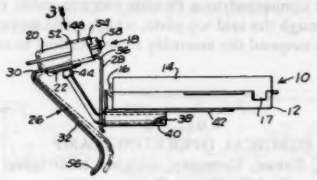
4,032,772
LIGHT ATTACHMENT FOR A COMPACT

John A. Mowbray, Satellite Beach, Fla., assignor to Agostino Orlando, Taylor, Mich.

Filed July 12, 1976, Ser. No. 704,306
Int. Cl.² A45C *15/06*
U.S. Cl. 240—6.45 R **14 Claims**

1. A light attachment for a compact comprising a support adapted to be secured to the body portion of a compact of the type having a hinged cover with a mirror on the inner face thereof, an arm on said support, a flashlight having a generally

flat mounting face, said flashlight having a depressible switch button on said face which when depressed energizes the light, said arm having a resiliently flexible leg thereon, said leg having an aperture therein, said flashlight being mounted on



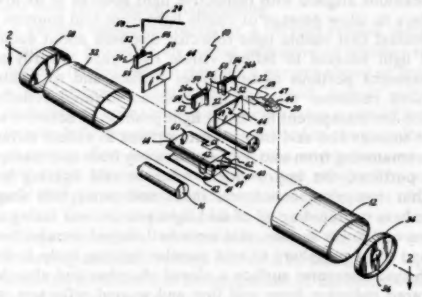
said leg with the switch button registering with said aperture and a rigid switch actuator on said arm projecting toward and terminating directly adjacent said switch button whereby when said leg is flexed toward said actuator said switch button is depressed to energize the light.

4,032,773

FLASHLIGHT

Richard L. Halliday, Jr., Fountainville; Robert R. Anderson, Dublin, and Richard L. Halliday, Doylestown, all of Pa., assignors to Halliday & Co., Inc., Doylestown, Pa.

Filed Dec. 18, 1975, Ser. No. 642,013
Int. Cl.² F21L *7/00*
U.S. Cl. 240—10.6 R **11 Claims**



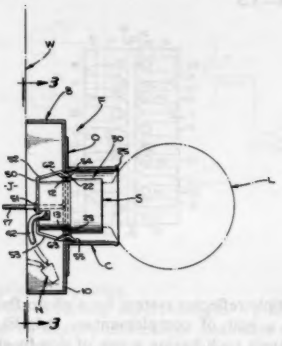
1. A flashlight comprising a housing having a generally flexible side wall, a battery retaining member in said housing including resilient arm members removably retaining a pair of batteries in spaced-apart relationship, said battery retaining member being made of an insulating material, a light bulb including housing, first and second conductor means carried on said battery retaining member adjacent said one end of said housing, each of said first and second conductor means being in contact with one of said leads and with one of said batteries, a third conductor means carried on said battery retaining member adjacent the other end of said housing, said third conductor means being in contact with a conductive switch wire and with one of said batteries, said switch wire extending along said battery retaining member and being adjacent said side wall of said housing, said switch wire terminating adjacent to an exposed conductive surface of the other of said batteries and being normally spaced therefrom, whereby when said side wall of said housing is pressed said switch wire contacts said exposed conductive surface of said other battery completing a circuit between said batteries and said light bulb.

4,032,774

SNAP-TOGETHER LIGHT FIXTURE

Edward Spicer, 11631 Don Alicia Place, Studio City, Calif. 91604

Filed June 25, 1976, Ser. No. 699,947
Int. Cl.² F21S *1/02, 3/02, 5/00*
U.S. Cl. 240—73 LD **5 Claims**



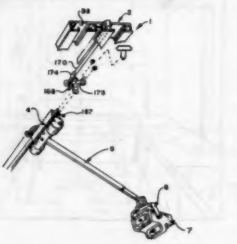
4. A snap-together light fixture including a bulb receiving socket having associated spring means for releasably locking the socket in a support, a metal cup for receiving and enclosing the socket, and a base member adapted to fit upon a wall or ceiling, the cup and base member cooperatively supporting the socket by means of openings through which the socket extends, while the spring means of the socket releasably grasps the edges of the openings for holding all three parts together.

4,032,775

ILLUMINATION SYSTEM

Mitchell Bobrick, Redondo Beach, Calif.; Murray L. Quin, St. Louis, and Morris M. Buzan, St. Charles, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo., a part interest

Division of Ser. No. 496,879, Aug. 12, 1974, Pat. No. 3,936,671. This application Oct. 24, 1975, Ser. No. 625,586
Int. Cl.² F21S *1/00*
U.S. Cl. 240—73 R **11 Claims**



1. In an illumination system for a medical facility, wherein a carriage track is mounted overhead and a carriage is mounted for movement along said carriage track, said carriage track extending from near a reference wall to a point distant from said reference wall, the improvement comprising said carriage track having spaced parallel ledges, said carriage having a plurality of wheels revolvably mounted on said carriage and resting upon said ledges, and a boom mount supported by said carriage and depending below said track; a boom swingably mounted in said boom mount; a lamp supported by said boom; electrical conductors carried by said boom and extending into said boom mount; a multiconductor-strip ribbon conductor disposed in a channel defined in part by one ledge of said track, said ribbon conductor being oriented with broad sur-

faces perpendicular to said ledge, and being of a length greater than the lengthwise travel of said carriage, said ribbon conductor being flexible and being doubled back intermediate its ends, said ribbon conductor being electrically connected at one of its ends to a source of current and at its other end to said electrical conductors carried by said boom.

4,032,776

AUTOMATIC OPTICAL FOCUSSING SYSTEM

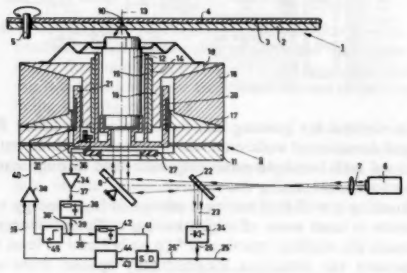
Gerard Eduard van Rosmalen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,659

Claims priority, application Netherlands, Jan. 16, 1976, 7600423

Int. Cl.² G01J 1/20

U.S. Cl. 250—201 8 Claims



1. An automatic optical focussing system for an apparatus for reading an information track on an information plane of a reflecting record carrier of the type comprising a radiation source means for providing a radiation beam

an optical focussing device for focussing the radiation beam to a read spot in a focussing plane and comprising a frame, an electrically controllable objective means provided with lenses which is axially movable relative to the frame in the direction of its optical axis for varying the position of the focussing plane, bearing means for mounting the objective so as to be movable relative to the frame, and electrodynamic drive means comprising at least one control coil for controlling the coarse position of the focussing plane, and means for causing the objective to oscillate at a high frequency in an axial direction, so that a high frequency oscillation about the coarse position of focussing plane is obtained,

a radiation detection responsive to the radiation beam, which has been modulated and reflected by the information track, for producing a detection signal depending on the position of the focussing plane relative to the information plane and

a control circuit means for producing a control signal which depends on the detection signal and for applying said control signal to the control coil of the optical focussing device,

the improvement comprising at least one resilient element connecting the objective to an oscillation-compensation element which is axially movable relative to the objective, the objective together with the oscillation-compensation element and the resilient element constituting a mechanical resonant system which oscillates with a high frequency.

4,032,777

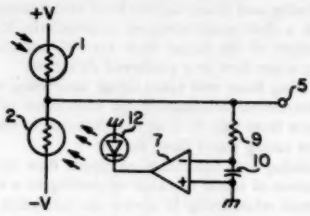
PHOTOMERIC MONITORING DEVICE

Robert Earl McCaleb, 5704 NE. 36th Ave., Portland, Oreg. 97211

Filed Mar. 29, 1976, Ser. No. 671,057

Int. Cl.² H01J 39/12

U.S. Cl. 250—214 B 11 Claims



1. A photometric monitoring sytem, comprising:

first transducer means for receiving light from a monitored light source and generating an electrical signal in response to a change thereof;

amplifier means responsive to said electrical signal for controlling the intensity of a reference light source;

second transducer means coupled to said first transducer means for receiving light from said reference light source and cancelling at least a portion of said electrical signal in response thereto; and

utilization means responsive to said electrical signal for providing an indication of said change of monitored light.

4,032,778

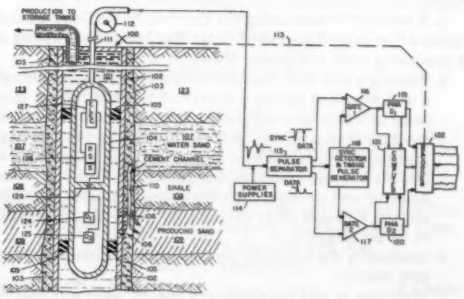
BEHIND CASING WATER VOLUME FLOW RATE MEASUREMENT USING GAMMA RAY SPECTRAL DEGRADATION

Hans J. Paap; Dan M. Arnold; Ward E. Schultz, and Harry D. Smith, Jr., all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,169

Int. Cl.³ G01V 5/00

U.S. Cl. 250—266 12 Claims



1. A method for measuring the location, linear flow rate, and volume flow rate of undesired water flow behind well casing in a producing well, comprising the steps of:

a. locating a well tool sized and adapted for passage through a well bore and having a source of high energy neutrons at least some of which have sufficient energy to cause the nuclear reaction O^{16} (np) N^{16} and at least two gamma ray detectors longitudinally spaced from said source and each other in a well bore at a depth to be investigated;

b. irradiating the borehole environs with high energy neutrons from said source;

c. detecting at said detectors gamma rays resulting from the decay of the unstable isotope N^{16} comprising a portion of

any undesired behind casing flow present and generating count signals representative thereof;

d. separating said count signals from at least one of said detectors into at least two separate energy dependent signals related to the energy of the gamma rays causing said signals and generating a ratio signal representative of the ratio of the at least two separate energy dependent signals;

e. combining said count signals from said detectors according to a first predetermined relationship to derive an indication of the linear flow rate of undesired behind casing water flow in a preferred direction;

f. generating from said ratio signal according to a second predetermined relationship an indication of the radial distance from said at least one detector to the undesired behind casing water flow; and,

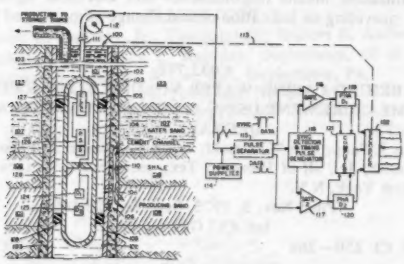
g. combining said indication of linear flow rate and said indication of radial distance according to a third predetermined relationship to derive an indication of the volume flow rate of the undesired behind casing flow.

4,032,779

BEHIND CASING WATER VOLUME FLOW RATE MEASUREMENT USING CONCENTRIC GAMMA RAY DETECTORS

Dan M. Arnold, and Hans J. Paap, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,170
Int. Cl.² G01V 5/00
U.S. Cl. 250—266 **10 Claims**



1. A method for measuring the location, linear flow rate and volume flow rate of undesired water flow behind well casing in a producing well, comprising the steps of:

a. locating a well tool sized and adapted for passage through a well bore and having a source of fast neutrons at least some of which have sufficient energy to cause the nuclear reaction O (n,p) N and at least two gamma ray detectors longitudinally spaced from said source and each other, at least one of said detectors comprising an inner cylindrical detector and an outer cylindrical shell detector coaxially aligned with said inner detector, in a well bore at a depth to be investigated;

b. irradiating the borehole invirons with fast neutrons from said source;

c. detecting at said longitudinally spaced detectors gamma rays resulting from the decay of the unstable isotope N16 comprising a portion of any undesired behind casing flow present and generating count signals representative thereof;

d. separating said count signals from said inner detector and said outer detector into separate signals and generating a ratio signal representative thereof;

e. combining said count signals from said longitudinally spaced detectors according to a first predetermined relationship to derive an indication of the linear flow rate of undesired behind casing water flow in a preferred direction;

f. generating from said ratio signal according to a second predetermined relationship an indication of the radial distance from said inner detector to the undesired water flow behind the casing; and

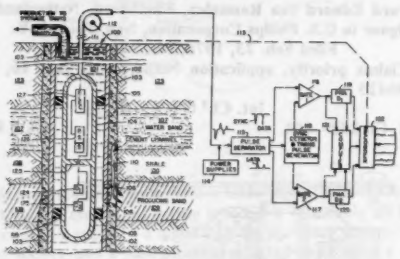
g. combining said linear flow rate indication and said radial distance indication according to a third predetermined relationship to derive an indication of the volume flow rate of the undesired behind casing flow.

4,032,780

BEHIND CASING WATER FLOW DETECTION USING CONTINUOUS OXYGEN ACTIVATION

Hans J. Paap; Dan M. Arnold, and Harold E. Peelman, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,174
Int. Cl. G01v 5/00
U.S. Cl. 250—266 **16 Claims**



1. A method for locating and determining the linear flow rate and direction of undesired water migration behind casing in a cased well borehole producing well fluid through casing perforations, comprising the steps of:

a. locating a well tool having a source of high energy neutrons at least some of which having sufficient energy to cause the nuclear reaction O^{16} (n,p) N^{16} and at least two gamma ray detectors longitudinally spaced from said source and each other to a position adjacent above or below the perforations;

b. irradiating the borehole environs with high energy neutrons from said source;

c. detecting at each of said detectors gamma rays primarily caused by the decay of the unstable isotope nitrogen 16 and generating signals representative thereof;

d. combining said signals according to a predetermined relationship to derive an indication of the direction and linear flow rate of any elemental oxygen nuclei comprising undesired fluid flow in a preferred direction behind the well casing at said adjacent position; and

e. estimating the radial distance from the detector locations of such undesired fluid flow and combining said distance and said linear flow rate indication according to a second predetermined relationship to provide an indication of the volume flow rate of such undesired flow.

4,032,781

WELL FLUID PRODUCTION PROFILING USING AN OXYGEN ACTIVATION FLOW METER

Dan M. Arnold, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,175
Int. Cl.² G01V 5/00
U.S. Cl. 250—266 **8 Claims**

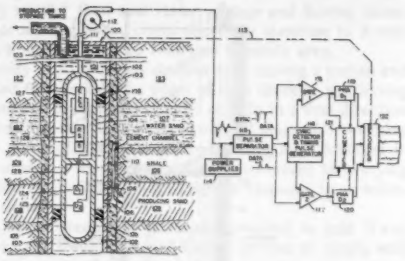
1. A method for locating and measuring the entry of undesired water cut through casing perforations into a known size cased well borehole having multiple sets of longitudinally spaced perforations for the production of fluids from formations communicating with the well bore through the perforations, comprising the steps of:

a. locating a well tool having a source of high energy neu-

trons having sufficient energy to cause the nuclear reaction $O^{16}(n,p)N^{16}$ and at least two gamma ray detectors longitudinally spaced from said source and each other to a position adjacent a set of perforations whose fluid flow condition is to be investigated;

b. repetitively irradiated the borehole environs with bursts of high energy neutrons from said source;

c. detecting subsequent to each neutron burst at each of said detectors gamma rays caused by the decay of the unstable isotope nitrogen 16 and generating signals representative thereof;



d. combining said representative signals according to a first predetermined relationship to derive an indication of the linear flow rate of any elemental oxygen nuclei comprising the produced fluid flow from the set of perforations being investigated; and

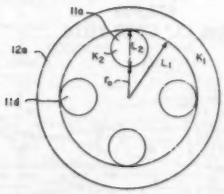
e. combining the known inside casing cross sectional area with said indication of linear flow rate according to a second predetermined relationship to derive an indication of the volume flow rate of an elemental oxygen nuclei comprising the produced fluid from the set of perforations being investigated.

4,032,782

TEMPERATURE STABLE MULTIPOLE MASS FILTER AND METHOD THEREFOR

Ronald D. Smith, Bovingdon, England; William J. Fies, Portola Valley, Calif.; John R. Reeher, Los Gatos, Calif., and Michael S. Story, Los Gatos, Calif., assignors to Finnigan Corporation, Sunnyvale, Calif.

Filed June 4, 1976, Ser. No. 692,846
Int. Cl.² H01J *39/34*
U.S. Cl. 250—292 **5 Claims**



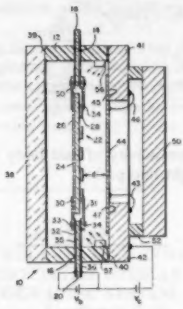
1. A method of maintaining R_o constant over a wide temperature range in a multipole mass filter having rods and a rod mounting means comprising the following steps: determining the theoretical ratio of thermal coefficients of expansion of said rods and said rod mounting means to maintain R_o constant with reference to a specific mass filter construction; selecting rods and rod mounting means respectively having thermal coefficient of expansion substantially matching said theoretical ratio; and affixing said rods to said mounting means.

4,032,783

PYROELECTRIC RADIATION SENSOR AND IMAGING DEVICE UTILIZING SAME

Nobuo John Koda, Vista, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 584,805, June 9, 1975, abandoned. This application May 21, 1976, Ser. No. 688,666
Int. Cl.² H01J *31/49*
U.S. Cl. 250—333 **11 Claims**



1. In combination, an infrared sensor including:

a. a pyroelectric substrate having first and second major surfaces,

b. a layer of conductive infrared radiation absorbing material on said first major surface, and

c. a metallic grid including discrete grid lines disposed on said second major surface and exposing predefined discrete areas of said second major surface, whereby upon the application of a predetermined bias voltage between said layer of conductive material and said grid and the receipt of both predetermined constant photon energy by said second major surface and infrared radiation by said first major surface, said substrate develops open circuit voltages between discrete lines of said metallic grid which alter the electric field patterns adjacent said grid and, in turn, control the quantity of photo-electrons released from said grid and available for acceleration to a remote target.

4,032,784

METHOD AND APPARATUS FOR EXAMINING A BODY BY A BEAM OF X-RAYS OR OTHER PENETRATING RADIATION

Leonard G. Rich, West Hartford, Conn., assignor to The Gerber Scientific Instrument Company, South Windsor, Conn.

Filed Aug. 4, 1975, Ser. No. 601,308
Int. Cl.² G01J *1/42*
U.S. Cl. 250—355 **19 Claims**

1. A system for examining a body by a beam of penetrating radiation, said system comprising:

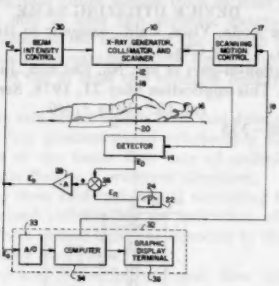
means for providing a collimated beam of penetrating radiation and for moving said beam relative to a body to be examined to cause it to have a succession of different straight line paths passing through said body,

a detector for detecting the intensity of said beam after passage through said body and for producing a corresponding detected intensity signal,

means responsive to said detected intensity signal for varying the emitted intensity of said beam to maintain said detected intensity signal at an essentially constant value,

means for providing an output signal having a value corresponding to the value of said emitted intensity of said beam, and

means utilizing said output signal as a source of information



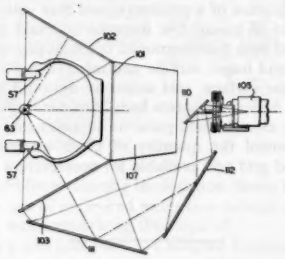
about the transmissivity of said body along each of said different straight line paths.

4,032,785

TIRE INSPECTION MACHINE PRESENTING AN X-RAY IMAGE OF THE ENTIRE WIDTH OF THE TIRE

Donald T. Green, Mentor, Ohio, and Edward de Benedetti, San Jose, Calif., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 28, 1974, Ser. No. 455,544
Int. Cl.² G01N *23/00*
U.S. Cl. 250—358 T **9 Claims**



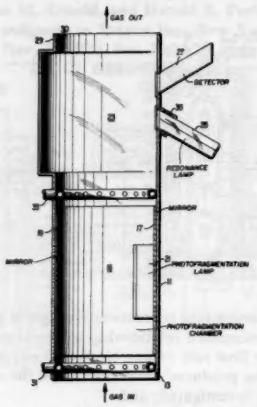
1. An X-ray inspection system for a pneumatic tire, comprising:
   a. a support for a tire,
   b. means for stepwise rotation of a tire on the support,
   c. a plurality of fluorescent screens extending essentially around the entire width, from bead to bead, of the outside of a sector of a tire on the support,
   d. at least one X-ray source,
   e. means for directing X-rays from the X-ray source to each fluorescent screen in turn through the wall of the said sector of a tire on the support to form essentially adjoining shadow pictures of different parts of the sector of the tire on the several fluorescent screens,
   f. a video camera,
   g. means for exposing the video camera to each fluorescent screen in turn through paths of essentially equal optical length to produce a sequence of electronic images of the said adjoining shadow pictures,
   h. means for transferring the several electronic images in the video camera in turn to adjacent positions in a storage device, to produce an essentially complete composite image of the said sector of a tire, and
   i. means for displaying the said composite image as a still picture on a monitor.

4,032,786

METHOD OF USING RESONANCE ATOMIC SCATTERING OF RADIATION TO MEASURE GASEOUS SPECIES

Robert A. Young, Loretto, Canada, assignor to Xonics, Inc., Van Nuys, Calif.

Continuation of Ser. No. 562,221, March 26, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 672,974
Int. Cl.² G01J *1/42*
U.S. Cl. 250—373 **13 Claims**



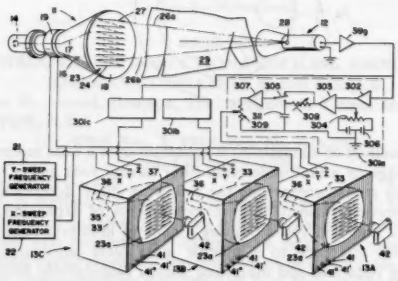
1. A device for measuring gaseous species comprising a scattering chamber;
   a resonance lamp illuminating said chamber;
   a detector for measuring the scattered light within said chamber;
   conduit means for delivering said gaseous species to said chamber;
   a photofragmentation chamber within said conduit for selectively decomposing said gaseous species; and
   means for adding gaseous species to the gas in said conduit.

4,032,787

METHOD AND APPARATUS PRODUCING PLURAL IMAGES OF DIFFERENT CONTRAST RANGE BY X-RAY SCANNING

Richard D. Albert, 317 Hartford Road, Danville, Calif. 94526

Continuation-in-part of Ser. No. 481,954, June 24, 1974, Pat. No. 3,949,229. This application Apr. 5, 1976, Ser. No. 673,908
Int. Cl.² G03B *41/16*
U.S. Cl. 250—402 **10 Claims**



1. Apparatus for simultaneously producing plural radiographic images of a subject comprising:

a scanning X-ray source having a broad target plate and an electron gun for directing an electron beam towards said target plate and having electron beam deflection means for sweeping said electron beam along said target plate in a first direction in reponse to a first sweep signal and a means for sweeping said electron beam in a second orthogonal direction in response to a second sweep signal to establish a moving origin point of X-rays on said target plate which sweeps through a raster pattern thereon,

an X-ray detector spaced apart from said source whereby said subject may be disposed therebetween, said detector having an active radiation sensitive area which is substantially smaller than said raster pattern and having means for producing X-ray count signals in response to X-rays which impinge on said radiation sensitive area,

a plurality of X-Y display devices each having a screen and means for producing a point of light thereon and having means for sweeping said point of light in a first direction in response to a first sweep signal and means for sweeping said point of light in a second orthogonal direction in response to a second sweep signal and means for warying the intensity of said point of light in response to an intensity signal,

a first sweep frequency generator coupled to said X-ray source and to each of said display devices to supply said first sweep signal to each thereof,

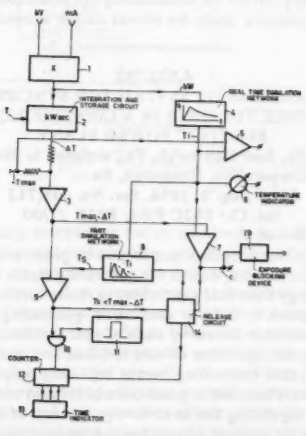
a second sweep frequency generator coupled to said X-ray source and each of said display devices to supply said second sweep signal thereto, and

a plurality of signal processing circuits, each being connected to said X-ray detector and to an associated separate one of said display devices to supply said intensity signal to said associated one of said display devices, said signal processing circuits having means for establishing a different predetermined intensity signal range for each said display devices in response to output signals from said detector.

4,032,788
CIRCUIT ARRANGEMENT FOR SUPERVISING THE LOADING OF AN X-RAY TUBE

Peter Stege, Hamburg, and Bernd Hermeyer, Henstedt-Ulzburg, both of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,394
Int. Cl.² H05G 1/30
U.S. Cl. 250—414 **14 Claims**



1. In an x-ray diagnostic apparatus, a circuit for supervising the loading of an x-ray tube comprising, means for forming a first signal which is dependent on the x-ray tube anode temperature T_i and which controls an indication device,

a. a circuit arrangement for forming a second signal which corresponds to the maximum allowed temperature (T_{max}) of the tube anode minus a temperature value (ΔT) which is dependent on an anticipated exposure load of the x-ray tube,

b. a fast simulation network for providing an output signal T_s indicative of the accelerated simulation of the anode temperature, means for applying said first signal to the fast simulation network at the beginning of each simulation cycle,

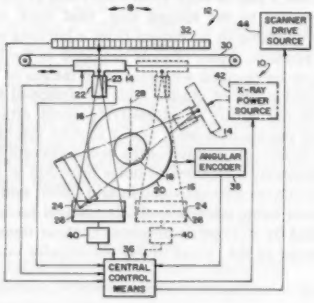
c. a time measuring device for measuring the time expiring between the beginning of a simulation cycle and the instant at which the output signal (T_s) of the fast simulation network becomes smaller than the second signal, and

d. an indication device controlled by the time measuring device.

4,032,789
MEANS FOR CONTROLLING OPERATION OF POWER SOURCES ASSOCIATED WITH AN AXIAL TOMOGRAPHIC SYSTEM

Samuel Thomas Workman, Los Gatos, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Oct. 28, 1975, Ser. No. 625,806
Int. Cl.² G03B 41/16
U.S. Cl. 250—445 T **22 Claims**



1. An axial tomographic system including scanner means for collecting a plurality of sets of data corresponding to the transmission or absorption of one or more beams of penetrating radiation through a planar slice of an object to be examined, said scanner means including one or more power sources associated therewith, said scanner means adapted to automatically return to the "off" condition during scanning operation if not maintained in the "on" condition; means for activating said scanner means to establish an "on" condition to thereby enable scanning operation to occur; and control means including means to measure one or more system parameters when said scanner means is in the "on" condition and to determine if the measured parameters are within predetermined limits therefor, and means for maintaining said "on" condition only if said control means is properly operational and all measured system parameters are within the predetermined limits therefor, said means for maintaining the "on" condition including means to send a series of periodic operation-maintaining signals to each of said power sources, said operation-maintaining signals being sent only if said control means is properly operational and all measured system parameters are within the predetermined limits therefor, whereby, if said control means is not operational or any measured system parameter is outside the predetermined limits therefor, said power sources are automatically electrically isolated from the units driven

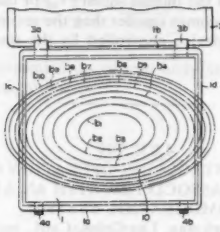
thereby due to failure of said power sources to receive an operation-maintaining signal from said signal-sending means.

4,032,790

X-RAY FILM CARTRIDGE

Takeshi Nakamura, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 3, 1976, Ser. No. 682,400
Claims priority, application Japan, May 12, 1975, 50-63466; Jan. 30, 1976, 51-9291
Int. Cl.² A61B 6/00; G03B 41/16
U.S. Cl. 250—480 4 Claims



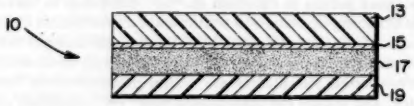
1. An X-ray film cartridge comprising in combination: a rectangular cartridge body having a front wall, pair of side walls and a back wall; a rectangular cover hinged at one side thereof to the back wall of said body by means of a pair of hinge means; a pair of latch means provided at one side of said cover opposite to the hinged side, said latch means being manually operable to be moved from a latching position to a released position; a pair of slots provided in the front wall of the body to be engaged with said latch means of the cover; a cushion pad made of elastic material attached to the inner surface of the cover; an intensifying sheet attached to the surface of the cushion pad; and a second intensifying sheet attached to an inner surface of the body; wherein the improvement comprising a number of holes provided in said cushion pad and a convex part provided in said cover, said convex part of the cover being convex to the inside and having a contour represented by concentric elliptical contour lines whose center is located at the center of the rectangular cover.

4,032,791

FLUORESCENT SCREEN AND METHOD OF MAKING

Vincent Chioln, and Sixdeniel Faria, both of Towanda, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 16, 1976, Ser. No. 696,799
Int. Cl.² G01T 1/00
U.S. Cl. 250—483 8 Claims



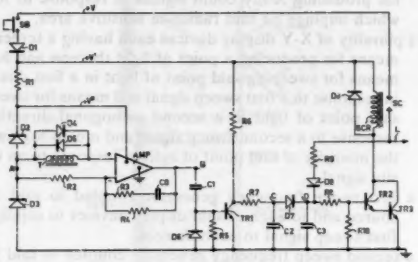
1. A fluorescent screen comprising:
a plastic film support layer having a first thickness;
a reflectance layer of vapor-deposited aluminum on said support layer and having a second thickness, the ratio of thicknesses of said support layer to said reflectance layer within the range of from about 7:1 to about 24:1;
a flexible layer of a fluorescent material dispersed in an organic polymeric binder, said flexible layer located on said reflectance layer and having a third thickness, the ratio of thicknesses of of said flexible layer to said reflectance layer within the range of from about 4:1 to about 22:1.

4,032,792

AUTOMOTIVE STARTER LOCKOUT SYSTEM

Derek John Parkyn, Westerham, and Alexander Hendrich Francis Keuleman, Horley, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 23, 1975, Ser. No. 570,617
Int. Cl.² F02N 11/00
U.S. Cl. 290—37 R 11 Claims



1. A starter motor lockout system for an internal combustion engine comprising, a starter switch, a transducer arranged to cooperate with a toothed annular member which is rotatable with the engine for detecting rotational movement of the engine to produce an alternating electric output signal whose frequency is a function of the speed of rotation of the engine, delay means including a capacitor, a semiconductor switch responsive to said electric output signal and coupled to said capacitor to control the mean charge thereon, means connecting said capacitor in a charging circuit while the starter switch is operated, the capacitor being connected periodically in a discharging circuit by the semiconductor switch at a rate determined by the frequency of said alternating electric output signal, a semiconductor output stage which is operative to energise a starter relay only when the mean charge on said capacitor has a predetermined value, which value is not attained for a predetermined time period after the starter switch has been operated with the engine at rest due to the time constant of the charging circuit, said relay being effective upon energisation thereof to close contacts to complete an energising circuit that supplies current to the starter motor, and a latching circuit for maintaining the semiconductor output stage operative while the starter switch is operated.

4,032,793

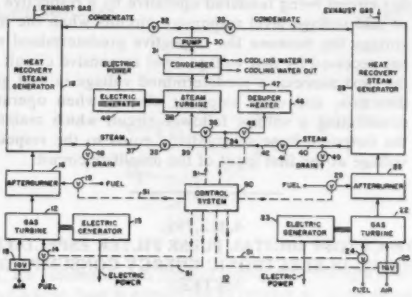
MANUAL/AUTOMATIC SYSTEM FOR SYNCHRONIZING MULTIPLE TURBINES IN A COMBINED CYCLE ELECTRIC POWER PLANT

Robert Uram, East Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1974, Ser. No. 495,713
Int. Cl.² F02C 9/04; F01K 23/00
U.S. Cl. 290—40 C 14 Claims

1. A combined cycle electric power plant comprising at least one gas turbine, means for generating steam in response to heat energy from said gas turbine, a steam turbine driven by steam supplied to it from said steam generating means, an electric generator driven by each of said turbines, means for controlling the operation of said turbines and steam generating means, said controlling means including a speed control for said gas turbine and a speed control for said steam turbine, means for regulating the field voltage of each of said generators during its startup, circuit breaker means for connecting each of said generators to a power system line, means for generating signals representing each generator voltage and

frequency and each line voltage and frequency, an operator station having an automatic/manual synchronization selector switch and means for generating speed change and voltage change demand signals for each turbine-generator when it is selected for manual synchronization, means responsive to said voltage and frequency signals for automatically generating voltage change and turbine speed change outputs for implementation by the associated ones of said turbine speed controls and said field voltage regulating means when an automatic synchronization signal is generated by said selector switch and the associated generator is being sychronized,



means for automatically generating a breaker close signal for each breaker means during synchronization of the associated generator on voltage and speed matches in the automatic synchronization mode, means for uncoupling the automatic synchronizing control paths and for coupling the speed and voltage change demand signals from said operator station to the selected turbine-generator when a manual synchronization signal is generated by said selector swtich, and means for generating a closing signal from the operator station for the breaker means associated with the generator selected for manual synchronization.

4,032,794

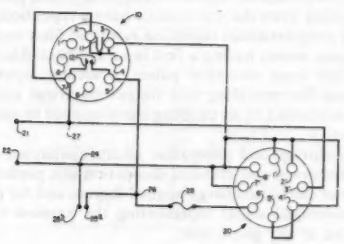
TELEVISION LOCKING MECHANISM

Robert P. Meade, 3419 42nd St., Metairie, La. 70001

Filed Sept. 19, 1975, Ser. No. 614,837

Int. Cl.² H01H *7/06*

U.S. Cl. 307—326 **9 Claims**



1. A locking mechanism for an appliance including a cabinet housing operational circuitry responsive to electric power supplied on an input power cord from an external source, comprising means for preventing an electrical connection between said operational circuitry and said input power cord after said input power cord has been disconnected from an external power source for a pre-set period of time, including time delay relay means for providing an electrical connection between said operational circuitry and said input power cord for energization of said circuitry within a pre-set period of time after said input cord is connected to said external source, switch means connected to said time delay relay means for electrically connecting said external power source to said time delay relay means, and removable plug means adapted to activate said switch means.

4,032,795

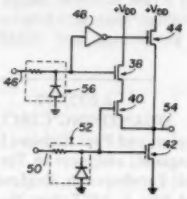
INPUT BUFFER

Robert R. Hale, Rancho Santa Fe, Calif., assignor to Solitron Devices, Inc., Tappan, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,722

Int. Cl.² H03K *19/08, 19/40*

U.S. Cl. 307—205 **7 Claims**



1. A signal processing circuit controlling output voltage comprising:

a series of field effect transistors including first and second such transistors of one conductivity type connected to a third such transistor of differing conductivity across a power source;

a fourth field effect transistor connected between said third such transistor and the power source in parallel with said first and second such transistors;

means to provide a control signal to said first field effect transistor and an inverted signal thereof to said fourth field effect transistor;

means to provide a data signal to said third of such transistors and to the second field effect transistor; and

means to provide an output of said circuit from the connection of said first and second such transistors to the power source from said fourth field effect transistor to said third field effect transistor.

4,032,796

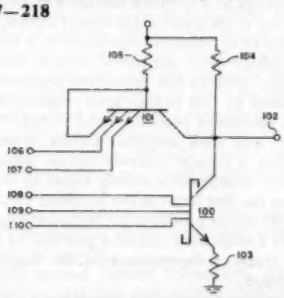
LOGIC DOT-AND GATE CIRCUITS

David E. Fulkerson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 497,018, Aug. 13, 1974, Pat. No. 3,970,866. This application Mar. 26, 1976, Ser. No. 670,811

Int. Cl.² H03K *19/08, 19/22*

U.S. Cl. 307—218 **7 Claims**



1. A circuit for performing logical functions including a "DOT--AND" function, said circuit comprising:

a non-inverting bipolar transistor having a non-inverting transistor base, a non-inverting transistor collector and a plurality of non-inverting transistor emitters therein, said non-inverting transistor emitters, including a first non-

inverting transistor emitter, being inputs to receive signals from sources of signals excepting those said non-inverting transistor emitters which are directly connected to said non-inverting transistor base including a second non-inverting transistor emitter so connected;

an inverting bipolar transistor having an inverting transistor collector, inverting transistor emitter and a plurality of inverting transistor bases therein, said inverting transistor bases being inputs to receive signals from source of signals, said inverting transistor collector being directly connected to said non-inverting transistor collector; and

a first resistor connected between said non-inverting transistor base and a first terminal means adapted for connection to a voltage source, whereby a logic gate circuit capable of performing said "DOT--AND" function is provided.

4,032,797

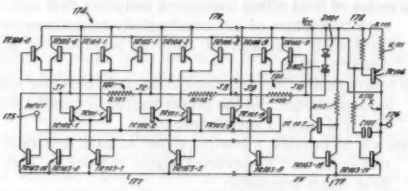
QUANTISING CIRCUIT

Eric Metcalf, Ropley, and Paul Nicholas Loewenstein, Camberley, both of England, assignors to The Solartron Electronic Group Limited, Farnborough, England

Filed Aug. 6, 1975, Ser. No. 602,482

Int. Cl.² H03K *4/02*; G06G *7/12*; H03B *19/00*

U.S. Cl. 307—227 **14 Claims**



1. A quantising circuit for quantising an input voltage, comprising:

means for generating a set of predetermined voltages, each predetermined voltage being higher than the preceding one in the set;

a plurality of voltage level responsive circuits each connected to receive the input signal and a respective one of said predetermined voltages and each being operative to change from a first state to a second state as the input voltage passes through a level of equality with the respective predetermined voltage in a given direction;

an output circuit for producing an output voltage; and

a plurality of amplifier circuits each having a first input connected to receive a respective one of said predetermined voltages, a second input connected to receive said output voltage in a negative feedback sense, and an output coupled to the input of the output circuit, each amplifier circuit being rendered operative by a respective one of said voltage level responsive circuits when the input voltage lies between the respective predetermined voltage received by that voltage level responsive circuit and the next successive predetermined voltage in said given direction, and each amplifier circuit, when operative, constituting a voltage follower circuit which maintains the output voltage substantially equal to the respective voltage at the first input of the amplifier circuit, whereby the output circuit produces an output voltage which can take only a respective one of a plurality of substantially discrete levels in dependence on the magnitude of the input voltage.

14. In a quantising circuit for quantising an input voltage, said quantising circuit including means for generating a set of predetermined voltages, each predetermined voltage being higher than the preceding one in the set, a plurality of voltage level responsive circuits each connected to receive the input signal and a respective one of said predetermined voltages and each being operative to change from a first state to a second state as the input voltage passes through a level of equality with the respective predetermined voltage in a given direction, and an output circuit responsive to said voltage level responsive circuits for producing an output voltage which can take only a respective one of a plurality of substantially discrete levels in dependence on the magnitude of the input voltage; the improvement comprising:

a plurality of amplifier circuits each having a first input connected to receive a respective one of said predetermined voltages, a second input connected to receive said output voltage in a negative feedback sense, and an output coupled to the input of the output circuit, each amplifier circuit being rendered operative by a respective one of said voltage level responsive circuits when the input voltage lies between the respective predetermined voltage received by that voltage level responsive circuit and the next successive predetermined voltage in said given direction, and each amplifier circuit, when operative, constituting a voltage follower circuit which maintains the output voltage substantially equal to the respective voltage at the first input of the amplifier circuit.

4,032,798

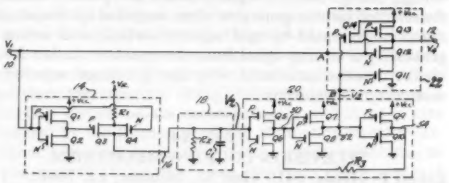
LOW CUTOFF DIGITAL PULSE FILTER ESPECIALLY USEFUL IN ELECTRONIC ENERGY CONSUMPTION METERS

Miran Milkovic, Scotia, N.Y., assignor to General Electric Company

Division of Ser. No. 505,799, Sept. 13, 1974. This application Nov. 14, 1975, Ser. No. 631,968

Int. Cl.² H03K *9/06*, *3/286*

U.S. Cl. 307—233 R **14 Claims**



1. A digital electrical pulse filter which provides output electrical pulses directly corresponding to input electrical pulses when the input pulses have a repetition rate greater than a predetermined repetition rate and which provides no output pulses when the input pulses have a repetition rate less than said predetermined repetition rate, said filter comprising:

logic gate means having a first input connected to respond to said input electrical pulses, a second input and an output for providing said output electrical pulses only when enabled by an enabling signal applied to said second input;

energy storage and dissipation means connected for short term storage and eventual dissipation at a predetermined rate of electrical energy applied thereto and for providing an averaged signal representing the amount of energy stored at any given time;

a source of electrical energy;

switch means including a pair of complementary C-MOS active switch elements having opposite polarities connected between said source and said energy storage and dissipation means, said switch elements being controlled by said input electrical pulses to provide input pulses of energy to said energy storage and dissipation means corresponding to the occurrences of said input electrical pulses whereby the value of said averaged signal corresponds to the repetition rate of said input electrical pulses; and

trigger circuit means connected to receive said averaged signal and to provide said enabling signal to the second input of said logic gate only during the time when said

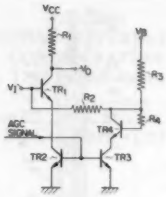
averaged signal exceeds a predetermined threshold value corresponding to said predetermined repetition rate.

4,032,799

AUTOMATIC GAIN CONTROL CIRCUIT

Takashi Sugimoto, Yokohama, and Yoshio Wada, Tokyo, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Mar. 2, 1976, Ser. No. 663,155
Claims priority, application Japan, Mar. 5, 1975, 50-26037
Int. Cl.² H03K *1/14*
U.S. Cl. 307—264 6 Claims



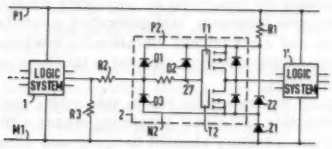
1. An automatic gain control circuit comprising a first transistor whose base is connected to receive an input signal and whose collector is connected to receive a first source voltage through a first resistor; a second transistor whose collector is connected to the emitter of the first transistor, whose emitter is grounded and whose base is connected to receive an automatic gain control signal; a third transistor whose base is connected to the base of the second transistor, and whose emitter is grounded; a fourth transistor whose emitter is connected to the collector of the third transistor, whose collector is connected to receive a second source voltage through a second resistor and whose base and collector are connected to each other; and a third resistor connected between the base of the first transistor and the collector of the fourth transistor.

4,032,800

LOGIC LEVEL CONVERSION SYSTEM

Walter Dröscher; Kurt Winter, both of Vienna, Austria, and Werner Meier, Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 7, 1975, Ser. No. 565,678
Claims priority, application Germany, Apr. 8, 1974, 2417054
Int. Cl.² H03K *17/00*
U.S. Cl. 307—296 A 6 Claims



1. In an arrangement in which two logic systems, having different logic level excursions, one having a large excursion and requiring a higher supply voltage and the other having a smaller excursion and requiring a lower supply voltage, are interfaced with each other, the logic system having a higher supply voltage being supplied with a reference potential M1 and a potential P1, the improvement comprising:

a. a series circuit including first and second series zener diodes and a resistor coupled between the potential P1 and the reference potential M1, the resistor having its free end coupled to the potential P1;

b. a first line from the junction point of said resistance and said series zener diodes providing a potential P2 and a second line from the junction between said series zener diodes providing a reference potential N2 for said logic system requiring a lower supply voltage; and

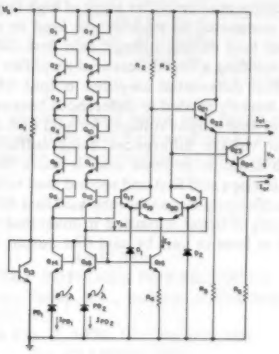
c. wherein said two logic systems have their inputs and outputs connected together through circuits not including level converters.

4,032,801

ELECTROMAGNETIC RADIATION INTENSITY COMPARATOR APPARATUS

David E. Fulkerson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 10, 1975, Ser. No. 621,315
Int. Cl.² G03B *7/08*, *3/00*; H03F *3/45*
U.S. Cl. 307—311 13 Claims



1. A photodiode array comparator for comparing electromagnetic radiation intensities occurring between portions of an array of photodiodes over a range of electromagnetic radiation intensities, said comparator providing a precise comparison indication of intensity differences occurring at said array portions when said intensity differences are relatively small but providing a limited comparison range to limit said comparison indication of said intensity differences when said intensity differences are relatively large, said comparator comprising:

a first portion and a second portion of said photodiode array;

a first comparator circuit comprising:

a first photodiode, as a part of said first array portion, providing a first photodiode output current and a second photodiode, as a part of said second array portion, providing a second photodiode output current substantially matched to said first photodiode output current when said first and second photodiodes are operating in similar conditions, said first photodiode output current being substantially linearly related to whatever electromagnetic radiation intensity occurs at said first photodiode within said range of electromagnetic radiation intensities and said second photodiode output current being substantially linearly related to whatever electromagnetic radiation intensity occurs at said second photodiode within said range of electromagnetic radiation intensities,

a first voltage regulator means to bias said first and second photodiodes at an operating point of approximately zero volts,

first and second current translators, electrically connected to said first and second photodiodes, respectively, providing first and second current translator output currents, respectively, which are substantially matched with one another when said first and second current translators are in similar opeating conditions, said first current translator output current being substantially linearly related to said first photodiode output current and said second current translator output

current being substantially linearly related to said second photodiode output current, and

first and second electrical loads, electrically connected to said first and second current translators, respectively, providing first and second load output voltages, respectively, which are substantially matched when said first and second electrical loads are in similar operating conditions, said first load output voltage being substantially logarithmically related to said first current translator output current and said second load output voltage being substantially logarithmically related to said second current translator output current; and

a first differential amplifier having (i) a first differential amplifier output, (ii) a first differential amplifier input of high impedance electrically connected to said first load to respond to said first load output voltage, and (iii) a second differential amplifier input of high impedance electrically connected to said second load to respond to said second load output voltage, said first differential amplifier providing a first differential amplifier output signal at said first differential amplifier output which is substantially linearly related to differences between said first and second load output voltages for said first and second load output voltage differences being sufficiently small but which tends to provide one or more first output limit signals when said first and second load voltage differences are sufficiently large whereby said first differential amplifier output signal is limited in magnitude to a range defined at least in part by said first output limit signals.

4,032,802

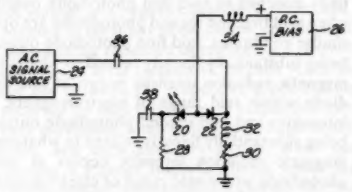
REDUCTION OF INTERMODULATION

Jing Jong Pan, and Milton Phillip Arnold, both of Melbourne, Fla., assignors to Harris Corporation, Cleveland, Ohio

Filed Feb. 9, 1976, Ser. No. 656,160

Int. Cl.² H03K 3/42

U.S. Cl. 307—311 **7 Claims**



1. A low distortion opto-electronic light source for use with a signal source generating an A.C. signal and comprising,

semiconductor light source means,

compensating means having a voltage dependent capacitance characteristic substantially similar to that of said light source means,

biasing means for applying a biasing current through said light source means and said compensating means, and

connecting means for connecting said light source means and said compensating means in anti-series across said signal source and in parallel across said biasing means.

4,032,803

HAND TOOL FOR CREATING AND APPLYING ULTRASONIC VIBRATION

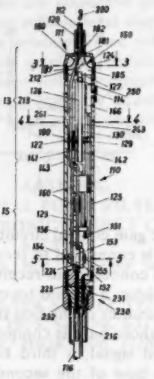
Walter Dürr, Bissingen, and Mathias Müller, Oberstenfeld, both of Germany, assignors to Dürr-Dental KG., Germany

Continuation-in-part of Ser. No. 459,164, April 8, 1974, abandoned, which is a continuation of Ser. No. 288,880, Sept. 13, 1972, abandoned. This application Apr. 12, 1976, Ser. No. 676,009

Claims priority, application Switzerland, Aug. 28, 1972, 012680/72

Int. Cl.² H01L 41/04

U.S. Cl. 310—8.1 **22 Claims**



1. A hand tool for creating and applying ultrasonic vibration, especially for dental, medical and cosmetic use, comprising:

a. handle means comprising a tubular casing of slender elongate form to facilitate holding and manipulation of the hand tool by a user, said casing having a forward end and a rearward end,

b. a piezoelectric vibratory element mounted in said casing for vibrational movement therein, said element comprising an elongate bar of piezoelectric material extending longitudinally in a forward portion of said casing,

c. a vibratable work-tip disposed forwardly of the forward end of said casing and means coupling said work-tip with said piezoelectric vibratory element to transmit vibration from said element to said work-tip,

d. signal generating means disposed in a rearward portion of said casing, said signal generating means comprising an oscillator for generating an alternating electrical signal of ultrasonic frequency, said generating means being spaced from and mechanically vibrationally insulated from said piezoelectric vibratory element in said forward portion of said casing,

e. circuit means wholly within said casing for electrically connecting said signal generating means with said piezoelectric vibratory element to apply said ultrasonic alternating electric signal to said piezoelectric vibratory element and thereby excite said element into ultrasonic vibration and by such vibration to produce ultrasonic vibration of said work-tip, said circuit means comprising flexible leads from said signal generating means to said piezoelectric vibratory element to provide electrical connection but mechanical vibrational insulation between said generating means and said vibratory element,

f. electrical conductor means electrically connected with said signal generating means and extending from the rearward end of said casing for supplying low voltage direct current to said signal generating means in said casing, and

g. fluid supply means comprising flexible fluid conduit means extending from the rearward end of said casing to

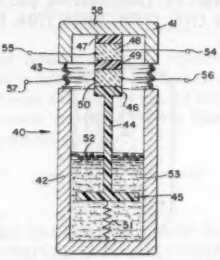
a fluid supply, and fluid passage means extending longitudinally through said casing from said fluid conduit means at the rearward end of the casing to the forward end of the casing to deliver fluid to said work-tip, said fluid passage means comprising a rearward portion to heat receiving relation to said signal generating means to cool the same, a forward portion in heat receiving relation to said vibratory element to cool the same, and a flexible intermediate portion between said rearward portion and said forward portion to provide continuity of said fluid passage means while providing mechanical vibrational insulation between said vibratory element and said signal generating means.

4,032,804

ULTRASENSITIVE DIFFERENTIAL RELAY CONFIGURATION

Gilbert F. Wagner, 1709 Pebble Beach Drive, Vienna, Va. 22180

Filed June 22, 1976, Ser. No. 698,657
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8.3 **14 Claims**



1. An ultrasensitive relay configuration comprising:
a relay container having a first end and a second end;
a contact secured to said first end of said container inside said container;
a contact arm housed inside said container, said contact arm having a first end and a second end;
a damping disc secured to said second end of said contact arm;
a spring having a first end secured to said damping disc and a second end secured to said second end of said container inside said container, said spring urging said first end of said contact arm into contact with said contact;
a viscous fluid stored in said container adjacent said second end of said container, said viscous fluid surrounding said spring, said damping disc and a portion of said contact arm between said damping disc and said first end of said contact arm; and
a flexible diaphram secured inside said container, said flexible diaphram surrounding said contact arm above the level of said viscous fluid and sealing said viscous fluid in the area of said container adjacent said second end of said container.

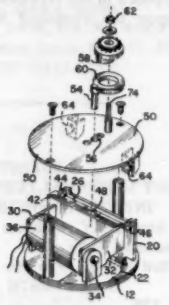
4,032,805

ELECTRICAL PULSE GENERATOR FOR REMOTE READING METER

John R. Hereford, New Haven, Mo., assignor to Gamon-Calmet Industries, Inc., Florence, Ky.

Filed Sept. 18, 1975, Ser. No. 614,369
Int. Cl.² H02K *35/00*
U.S. Cl. 310—15 **10 Claims**

1. A remote generating unit comprising a magnetizable core, a coil wound around said core and having output terminals, a pivot plate, rotating mechanical drive means, a spring member mounted only on said pivot plate, said pivot plate being movable between a first position in which said pivot plate closes a magnetic circuit including said magnetizable core, and a second position in which said pivot plate opens said magnetic circuit, said rotating mechanical drive means



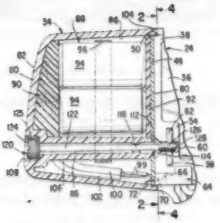
applying a force directly to said spring member to cause said pivot plate to move from said first position to said second position upon rotation of said mechanical drive means.

4,032,806

BATTERY POWERED POWER TOOLS

Robert West Seely, Easley, S.C., assignor to The Singer Company, New York, N.Y.

Filed Feb. 2, 1976, Ser. No. 654,330
Int. Cl.² H02K *7/14*
U.S. Cl. 310—50 **6 Claims**



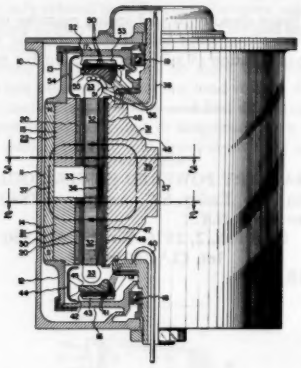
1. A power tool having a motor powered by a battery pack comprising:
a. a housing having one portion for journaling the motor and another portion for carrying the battery pack;
b. plug and socket means separately carried on each of the housing portions and detachably connectable to each other to place the battery pack in circuit with the motor;
c. connecting means including a nut carried in the motor portion of the housing, and a screw carried by the battery portion of the housing and adapted to be mechanically connected to the nut to join the housing portions, and the plug and socket means operatively together;
d. the screw having a longitudinal shank intermediate and en enlarged head at one end, and a threaded section at the other end;
e. a longitudinal aperture formed in the battery portion of the housing;
f. a necked-down portion formed in the aperture of a cross-sectional area larger than the shank, and smaller than the head and threaded section of the screw, whereby upon the screw being forced through the neck-down portion of the aperture the screw will remain normally entrapped therein by the neck-down portion with the screw free to rotate in the aperture;

g. the motor portion of the housing having two interconnected clamshell members;
h. a recess formed in each of the clamshell members in alignment with each other; and,
i. the nut disposed in the recesses to be held non-rotatively therein upon the clamshell members being interconnected.

4,032,807
INSIDE-OUT MOTOR/ALTERNATOR WITH HIGH INERTIA SMOOTH ROTOR

Eike Richter, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 6, 1976, Ser. No. 646,970
Int. Cl.² H02K *31/00*
U.S. Cl. 310—178 **20 Claims**



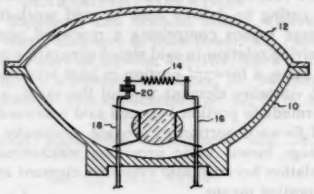
1. A homopolar inductor motor/alternator comprising:
a stator yoke;
an excitation field winding encircling the mid-axial region of said stator yoke;
first and second stacks of stator laminations encircling said stator yoke on either axial side of said excitation field winding;
a plurality of stator windings situated in axially-directed slots formed by said first and second stacks of stator laminations;
an inner rotor ring encircling each stack of said stator laminations and rotatable thereabout, each said rotor ring comprising alternate magnetic poles and nonmagnetic regions; and
an outer rotor ring encircling, and bonded to, each inner rotor ring, said outer rotor ring comprising a high strength magnetic material.

4,032,808
ELECTRIC INCANDESCENT LAMP

Werner Kischio, Aachen-Orsbach, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,271
Claims priority, application Germany, Apr. 12, 1975, 2516102
Int. Cl.² H01J *61/24*
U.S. Cl. 313—178 **1 Claim**

1. An electric incandescent lamp which comprises: a closed envelope; two conductive members extending through said envelope; a filament connected between said members and

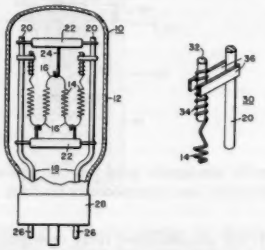


disposed within said envelope; and an oxygen getter, said oxygen getter being phosphorthionitride (PHNS).

4,032,809
TANTALUM CARBIDE OR TANTALUM-ALLOY CARBIDE FILAMENT MOUNTING AND METHOD

Richard Corth, East Orange, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 21, 1966, Ser. No. 535,835
Int. Cl.² H01J *1/16, 19/06;* **H01K** *1/04;* **H01J** *1/88*
U.S. Cl. 313—344 **6 Claims**



1. A combination connection for mechanically supporting and electrically connecting a coiled elongated incandescible filament principally comprising tantalum carbide to a main filament support and electrical connection means, said connection comprising:
a. a relatively thick elongated member principally comprising tantalum carbide;
b. a coiled end extension of said elongated filament coil snugly overfitting at least a part of said relatively thick elongated member, the inner surface of the overfitted turns of said end extension coil welded to said relatively thick elongated member; and
c. said relatively thick elongated member electrically connected to and mechanically supported by said main filament support and electrical connection means.

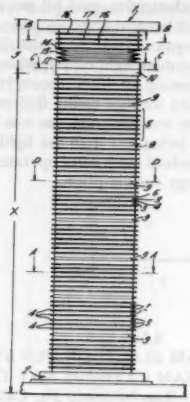
4,032,810
ELECTROSTATIC ACCELERATORS

Derek Anthony Eastham, Macclesfield, and Thomas Joy, Handforth, both of England, assignors to Science Research Council, London, England

Filed Sept. 5, 1975, Ser. No. 610,763
Claims priority, application United Kingdom, Sept. 10, 1974, 39514/74
Int. Cl.² H05H *5/00*
U.S. Cl. 313—360 **11 Claims**

1. An accelerating tube for an electrostatic particle accelerator comprising a plurality of conductive metal ring-shaped electrodes and ring-shaped insulators bonded together alternately, an electrical resistor chain external to the tube, and interconnections between each electrode and the resistor chain, the resistor values being such that, in response to an

electrical potential applied across the tube, a potential gradient exists along the tube, the tube having an axial portion thereof decoupled from said gradient, said axial portion being defined between a pair of spaced ring-shaped electrodes con-

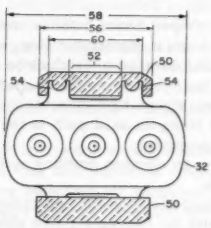


nected into the resistor chain by resistor values imparting equal potentials to said pair of electrodes, and a particle trapping means between said pair of spaced electrodes constituted by electrode means bearing a reverse bias potential with respect to the potential gradient.

4,032,811
UNITIZED IN-LINE ELECTRON GUN HAVING IMPROVED SUPPORT STRUCTURE

James W. Schwartz, Deerfield; Norman F. Gioia, Lombard, and Franklyn P. Gautier, Oak Park, all of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Dec. 18, 1975, Ser. No. 642,049
Int. Cl.² H01J *29/51*
U.S. Cl. 313—417 **6 Claims**

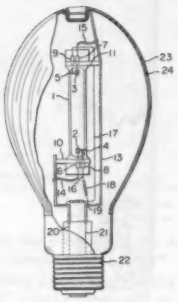


1. For use in a color television cathode ray tube, a unitized, in-line electron gun; that is, a gun generating three co-planar electron beams and having beam-forming and beam-shaping electrodes common to the three beams, said electrodes being supported as a coherent unit in spaced tandem succession along the gun's central axis by claws on the electrodes embedded in two elongated axially oriented structural beads positioned on opposite sides of the electrodes; that is, on opposite sides of the beam plane, at least one of said electrodes having on each side thereof at least one pair of widely spaced, relatively narrow claws integrally formed with the electrode, and lying respectively in planes transverse to the gun axis, with said claws embedded at widely spaced points on the glass bead to enhance the lateral stability of the electrodes, once embedded in the beads, to promote the establishment and maintenance of parallelism, precise spacing, and aperture concentricity of adjacent ones of said electrodes.

4,032,812
FLUORESCENT HIGH-PRESSURE MERCURY-VAPOR LAMP

Yoshichika Kobayashi, Ibaraki; Hidezoh Akutsu, Ashiya, and Katsuaki Iwama, Suita, all of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan

Filed Feb. 17, 1976, Ser. No. 658,375
Claims priority, application Japan, Feb. 19, 1975, 50-21216
Int. Cl.² H01J *61/12*
U.S. Cl. 313—487 **3 Claims**



1. A high-pressure mercury-vapor lamp of the type comprising an arc tube capable of the emission of both visible and ultraviolet light, an outer tube enclosing said arc tube, and a phosphor coating applied over the inner surface of said outer tube and consisting essentially of two kinds of phosphors, characterized in that one of said two phosphors is a red light emitting phosphor selected from the group consisting of

europium-activated yttrium-vanadate and

europium-activated yttrium-vanadate-phosphate; and the other phosphor emits blue-green light and consists of

bivalent europium- and manganese-activated barium-magnesium-aluminate having the following formula

$$Ba_{1-x}Mg_{2-y}Al_zO_{3+3/2z}: Eu_xMn_y$$

where $0.03 \leq x \leq 0.4$, $0.01 \leq y$ 0.6 and $12 < z < 20$.

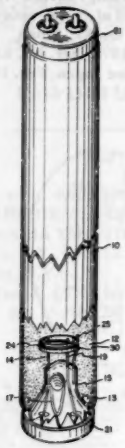
4,032,813
FLUORESCENT LAMP WITH REDUCED WATTAGE CONSUMPTION HAVING ELECTRODE SHIELD WITH GETTER MATERIAL

Joel Shurgan, Washington Township, Bergen County, and Donald P. Northrop, Glen Rock, both of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.

Continuation-in-part of Ser. No. 498,552, Aug. 19, 1974, abandoned. This application June 24, 1975, Ser. No. 589,664
Int. Cl.² H01J *61/10, 61/16, 61/44, 61/26*
U.S. Cl. 313—492 **7 Claims**

1. An energy saving fluorescent lamp for use with an existing ballast system designed for operation at a predetermined magnitude input voltage with a standard wattage rating fluorescent lamp, said energy saving fluorescent lamp comprising an envelope having a phosphor on the internal wall thereof, an electrode for emitting electrons and collecting ions at each end of the envelope, leads for connecting the electrodes to the existing ballast as source of electric current to energize the same, an ionizable mercury medium within said envelope, a fill gas in said envelope consisting essentially of krypton in the range of from about 75% to 90% and neon in the range from about 25% to 10%, an electrically conductive means insulated from the electrical connection to the electrodes surrounding each of said electrodes, and a getter material in said envelope for scavenging gas impurities, said fill gas and electrodes cooperating to start said lamp at a voltage at least 10% below said predetermined magnitude and to ionize the mercury to operate said lamp to produce light output when connected to

said ballast and consuming at least about 10% less energy than the standard wattage rating fluorescent lamp for which the ballast system was designed, the loss in light output produced



by the lamp being less than the light output which would be lost if the standard lamp were operated at the corresponding reduced energy consumption.

4,032,814

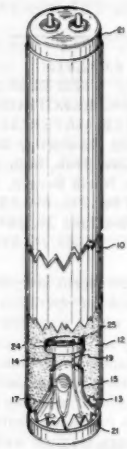
FLUORESCENT LAMP WITH REDUCED WATTAGE CONSUMPTION

Joel Shurgan, Washington Township, Bergen County, and Donald P. Northrop, Glen Rock, both of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.

Continuation of Ser. No. 498,552, Aug. 19, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,172

Int. Cl.² H01J *61/10, 61/16, 61/44*

U.S. Cl. 313—492 **5 Claims**



1. An energy saving fluorescent lamp for use with an existing ballast system designed for operation at a predetermined magnitude input voltage with a standard wattage rating fluorescent lamp, said energy saving fluorescent lamp comprising an envelope having a phosphor on the internal wall thereof, an electrode for emitting electrons and collecting ions at each end of the envelope, leads for connecting the electrodes to the existing ballast as the source of elecric current to energize the same, an ionizable mercury medium within said envelope, a fill gas in said envelope consisting essentially of krypton in the range of from about 75 to 90% and neon in the range from about 25 to 10%, and an electrically conductive means insulated from the electrical connections to the electrodes surrounding each of said electrodes, said fill gas and electrodes cooperating to start said lamp at a voltage at least 10% below said predetermined magnitude and to ionize the mercury to operate said lamp to produce light output when connected to said ballast and consuming at least about 10 percent less energy than the standard wattage rating fluorescent lamp for which the ballast system was designed, the loss in light output produced by the lamp being less than the light output which would be lost if the standard lamp were operated at the corresponding reduced energy consumption.

4,032,815

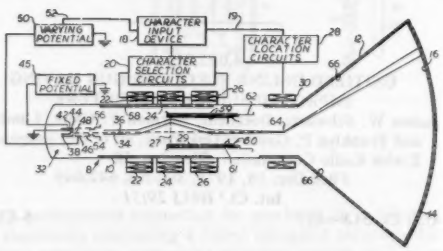
COLLIMATED BEAM ELECTRON GUN SYSTEM FOR SHAPED BEAM CATHODE RAY TUBE

Dan Joseph Haflinger, Rancho Santa Fe, Calif., assignor to Stromberg Datagraphix Inc., San Diego, Calif.

Filed Nov. 4, 1975, Ser. No. 628,805

Int. Cl.² H01J *29/46, 29/56*

U.S. Cl. 315—14 **14 Claims**



1. For use in a shaped beam cathode ray tube system in which an electron beam is accelerated along an axial path in a cathode ray tube and directed to an electron beam stencil for shaping the beam into predetermined characters, an electron gun system for generating a high current, collimated beam of electrons directed along an axial path in the tube, said electron gun system comprising:

a cathode having an electron emitting surface for emitting free electrons;

a collimating electrode adjacent said cathode and having a central aperture for passing the free electrons;

means for applying a potential to said collimating electrode substantially fixed relative to the potential of said cathode;

a control electrode axially spaced from said collimating electrode in the direction of the beam and having a central aperture axially aligned with the aperture in said collimating electrode;

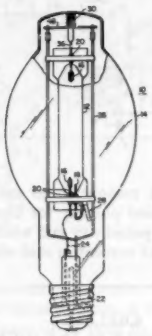
means for applying to said control electrode a control potential relative to said cathode which varies alternatively between a cut-off potential and a relatively positive potential acting in conjunction with said fixed potential to establish between the cathode and the aperture in said control electrode an electric field for accelerating the free electrons in a beam along the axial path, said electric field being substantially axial over at least a central portion of the electron beam so as to collimate the electrons at least in a central portion of the beam from the cathode through the aperture in said control electrode.

4,032,816

SAFETY SWITCH WHICH RENDERS HID LAMP INOPERATIVE ON ACCIDENTAL BREAKAGE OF OUTER ENVELOPE

Ferdinand Rokosz, Pompton Plains, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 609,138, Aug. 29, 1975, abandoned. This application Jan. 16, 1976, Ser. No. 649,775
Int. Cl.² H01J 7/44, 13/46, 17/34; H01K 1/62
U.S. Cl. 315—73 7 Claims



1. In combination with a high-intensity discharge lamp comprising an elongated radiation-transmitting arc tube which is enclosed by and supported within a light-transmitting protective envelope which is opaque to short wavelength ultraviolet radiations, said arc tube enclosing a discharge-sustaining filling and having electrodes operatively positioned therein proximate the ends thereof, electrical lead-in means sealed through said arc tube and connected to said electrodes, electrical adaptor means affixed to the outer surface of said protective enevelope to facilitate electrical connection of said lamp to a source of electrical power, and electrical conductor means electrically connecting said electrical adaptor means to said electrical lead-in means, the improvement which comprises:

a. a make-and-break switch means included in series circuit arrangement with said electrical conductor means, said switch means including an electrical contact member having an open position in which said switch means is electrically nonconductive and said electrical contact member also having a closed position in which said switch means is electrically conductive, a spring urging said electrical contact member to the open position, and said electrical contact member being movable to the closed position against the resilient force of said spring;

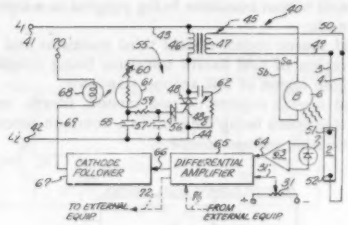
b. positioning means within said protective envelope for maintaining said switch means in predetermined position within said protective enevelope, and a mechanical contact member of said positioned switch means pressing against the inner surface of said protective envelope to maintain said electrical contact member in said closed electrically conductive position against the resilient force of said spring; whereby breakage of said protective envelope will permit said electrical contact member to move to said open electrically nonconductive position under the resilient force of said spring to render said lamp inoperative.

4,032,817

WIDE RANGE POWER CONTROL FOR ELECTRIC DISCHARGE LAMP AND PRESS USING THE SAME

Abraham W. Richmond, West Melbourne, Fla., assignor to Harris Corporation, Cleveland, Ohio

Filed Dec. 12, 1974, Ser. No. 532,172
Int. Cl.² H05B 37/02
U.S. Cl. 315—149 14 Claims



1. A power supply for controlling the application of power to an arc discharge lamp, comprising:

a transformer having a primary winding adapted to be connected to A.C. power lines and a secondary winding adapted to be connected across said lamp;

A.C. power supply control means connected to said primary winding for supplying A.C. voltages from the A.C. lines to said lamp through said transformer of sufficient amplitude to ionize the gas in said lamp so that said lamp fires and controlling the level of A.C. power supplied to said lamp from said A.C. lines, said control means being responsive to a control signal for varying the amount of power supplied to said lamp in dependence upon the value of said control signal;

feedback means comprising sensor means positioned to receive radiation emitted from said lamp to provide an output signal having a value dependent upon the intensity of said radiation and, hence, upon the amount of power supplied to said lamp, and means for comparing said signal with a reference indicative of desired lamp output intensity and providing an error signal having a value in dependence upon any difference therebetween;

means for supplying said control signal of a value dependent on said error to said A.C. power supply control means for controlling the A.C. power supplied to said lamp; and

means for varying said reference for controlling the A.C. power supplied to said lamp in such a manner that the output intensity of said lamp is adjustable over a substantial portion of its range of output intensity without extinguishing.

4,032,818

UNIFORM CURRENT LEVEL CONTROL FOR DISPLAY PANELS

Stephen J. C. Chan, San Diego, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 10, 1975, Ser. No. 630,198
Int. Cl.² H05B 41/14
U.S. Cl. 315—169 R 4 Claims

1. In a system for driving display panels having a plurality of rows for displaying alphanumeric characters, said system including a plurality of MOS integrated circuit chips, one each for driving each character row; the improvement comprising a current level control for maintaining uniform brightness in each of the character rows regardless of various characteristics between the chips, said current level control comprising:

a plurality of MOS integrated circuit chips, one each for driving a character row in the display panel;

each chip having an output transistor coupled to display devices in its respective character row, said output

transistor having a source region, gate region, and drain region;

a second transistor on the same integrated circuit chip as said output transistor, said second transistor having a source region, gate region, and drain region,

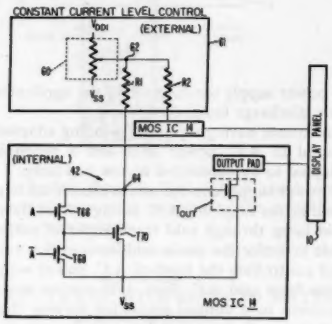
third and fourth transistors on the chip each having a source region, gate region, and drain region;

said drain region of said second transistor, the drain region of said third transistor, and the gate region of said output transistor being coupled to a common first node;

said source region of said third transistor and the drain region of said fourth transistor being coupled to the gate region of said second transistor;

said source regions of said second, fourth, and output transistors being coupled to a common second node;

a variable voltage source;



a plurality of reference resistors, one each for each chip; each resistor being of equal value and being coupled between said voltage source and the first node on its respective chip;

said third transistor, when turned on, providing a turn on voltage to the gate of said second transistor having the same potential as the drain thereof;

said second transistor providing a current path through its drain and source region thereby producing a voltage between said drain and source regions as a function of current flow, said current flow being a function of the characteristics of the respective chip; and

said voltage between the drain and source of said second transistor providing a voltage at the gate of its respective output transistor which will maintain uniform current flow in the output transistors of all of said chips thereby providing uniform brightness in each character row of the display panel regardless of various characteristics between the chips.

4,032,819
RASTER CENTERING CIRCUIT

Michael Lee Henley, Indianapolis, and Lawrence Edward Smith, Noblesville, both of Ind., assignors to RCA Corporation, New York, N.Y.

Filed July 30, 1975, Ser. No. 600,511
Int. Cl.² H01J 29/54
U.S. Cl. 315—398 **3 Claims**

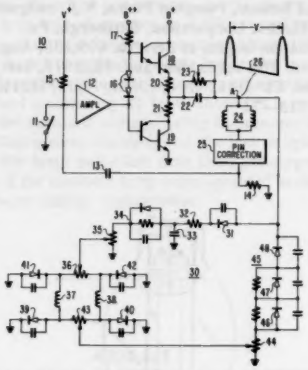
1. A raster centering circuit, comprising:

a deflection amplifier;

a coupling capacitor and a deflection winding serially coupled to an output terminal of said amplifier, said amplifier operated such that there is always a direct current voltage of a first fixed polarity across said coupling capacitor;

a convergence circuit including oppositely poled unidirectional current conducting devices coupled in parallel with said deflection winding, loading said deflection winding such that there is a direct current of a first polarity in said winding during each trace portion of a deflection cycle; and

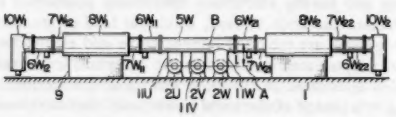
a direct current circuit coupled in parallel with said coupling capacitor and responsive to said direct current voltage of a first fixed polarity for controlling a direct current of a second polarity in said winding thereby controlling the net direct current in said winding.



4,032,820
HORIZONTAL DOUBLE PLANE HIGH VOLTAGE SWITCHING ASSEMBLY

Kazuaki Oishi; Seizo Nakano, both of Hitachi, and Shouetu Suda, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 5, 1975, Ser. No. 574,328
Claims priority, application Japan, May 6, 1974, 49-54675; June 12, 9174, 49-65934; June 19, 1974, 49-70700
Int. Cl.² H02B 1/04
U.S. Cl. 361—333 **12 Claims**



1. A gas insulated power switch-gear apparatus comprising:

at least one circuit breaker including a cylindrical tank filled with an insulating quenching gas having its axis substantially parallel with a foundation of the apparatus and spaced with a predetermined distance from said foundation, and at least one breaker section electrically insulated and supported within said tank along said axis;

at least one gas insulated feeding bus bar including a feeding conductor and a sheath filled with an insulating gas and having said feeding conductor insulatingly supported therein;

at least one gas insulated main bus bar including a main conductor and a sheath filled with an insulating gas and having said main conductor insulatingly supported therein; and

at least one gas insulated disconnecting switch arranged within a sheath filled with an insulating gas having two terminals, one connected with said circuit breaker and the other connected with said main bus bar through said feeding bar;

wherein said gas insulated feeding bus bar and said gas insulated disconnecting switch are disposed on the extension of said axis of said tank, and said gas insulated main bus bar is spaced from said foundation with a distance different from said predetermined distance and disposed

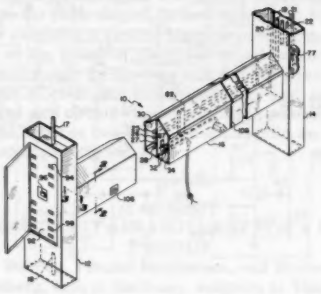
substantially in parallel with said foundation and at right angles to said axis and its extension.

4,032,821

UTILITY DISTRIBUTION CONSOLE

William Keiser, St. Louis, Mo., assignor to McGraw-Edison Company, Elgin, Ill.

Filed Apr. 2, 1976, Ser. No. 673,065
Int. Cl.² H02B *1/06*
U.S. Cl. 361—334 **1 Claim**



1. A utility distribution console, comprising the combination of a pair of tubular risers, a tubular beam and means connecting the beam at its ends to and between the spaced risers; said risers each having interconnected wall structure defining at least one vertically oriented enclosed compartment and said beam having interconnected wall structure defining at least two horizontally oriented enclosed compartments, and said wall structure having openings interconnecting one compartment of the beam with the compartment of one riser and interconnecting the other compartment of the beam with the compartment of the other riser; utility transmission means in each riser compartment and the corresponding beam compartment, means providing exposed outlet connections at selected locations spaced along the beam for each of the utility transmission means, means for providing in-the-field connections of the utility to each riser utility transmission means, a control panel in one of the risers and a plurality of control elements in the panel, and means routing the utility transmission means in a series connection through the control elements in the panel and only then to the selected beam output connections respectively, to provide centralized control of the corresponding utility for all of said beam output connections at the control panel.

4,032,822

ELECTROMAGNETIC FLUSH CONTROL SETUP IN FLUSH TOILET

Yee Kyar Un, No.9, Alley 559, Section 2, Fu-Hsin S. Road, Taipei, China /Taiwan

Filed Dec. 18, 1975, Ser. No. 641,894
Int. Cl.² H01H *47/32*
U.S. Cl. 361—205 **3 Claims**

1. An electromagnet flush control setup for use in a flush toilet comprising:

an inducing terminal made of conductive metal;

an amplifier for amplifying a signal induced in said inducing terminal;

a transformer having a primary and a secondary winding, said primary winding connected to the output of said amplifier;

a rectifier having a first end connected to said secondary winding;

a transistor having a base lead connected to the second end of said rectifier, whereby said transistor is biased to an on state by the presence of a signal at said inducing terminal;

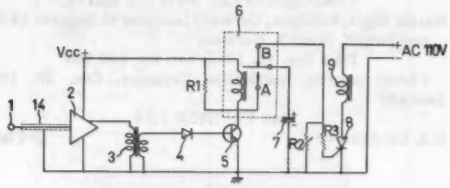
a D.C. power source;

a relay connected in series with said D.C. source and said transistor, whereby said transistor being in an on state causes said relay to move from a first position to a second position;

a capacitor connected to be charged by said D.C. source when said relay is in said second position;

an SCR having its gate connected to said capacitor when said relay is in said first position;

an A.C. power source;



an electromagnet coil connected in series with said A.C. source and said SCR, whereby said capacitor discharges through said SCR when said relay moves back to said first position, causing said SCR to conduct and energize said coil;

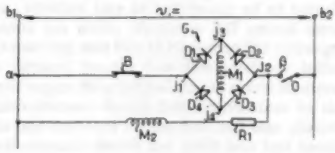
flush means activated by said coils to flush the toilet, whereby the presence of a human body on the toilet provides said signal in the inducing terminal and thereby causes said capacitor to be charged, and the termination of said signal causes said coils to be energized and the toilet to be flushed.

4,032,823

SUPPLY CIRCUIT FOR ELECTROMAGNETS

Jacques Arvisenet, La Celle St Cloud; Jean-Pierre Guery, Poissy; Jacques Olifant, Rueil-Malmaison, and Christian Thomas, Poissy, all of France, assignors to La Telemecanique Electrique, France

Filed Oct. 21, 1975, Ser. No. 624,514
Claims priority, application France, Oct. 28, 1974, 74.35952
Int. Cl.² H01H *47/04*
U.S. Cl. 361—194 **7 Claims**



1. In an electromagnet structure: a magnetic circuit including a stationary magnetic member and a further magnetic member which is movable to an attracted position with respect to the stationary magnetic member; an attracting coil associated with said magnetic circuit for moving said further member to its attracted position when the attracting coil is energized; a holding coil associated with said magnetic circuit for maintaining said further member in its attracted position when the holding coil is energized; bridge rectifier means for converting AC voltage from a source to DC voltage and applying the DC voltage across said attracting coil, said bridge rectifier means comprising first, second, third and fourth diodes, the catodes of the first and second diodes being electrically coupled to one end of the attracting coil and the anodes of the third and fourth diodes being electrically coupled to the other end of said attracting coil; switching means connecting one terminal of the voltage source to the anode of the first diode and to the cathode of the third diode, the anode of

the second diode and the cathode of the third diode being connected to the other terminal of the voltage source; the said switching means being in the open state when the said further member is in its attracted position, one end of the holding coil being electrically coupled to the said one terminal of the voltage source and means connecting the other end of the holding coil to the anode of the second diode and the cathode of the third diode.

4,032,824

VARIABLE-SPEED 3-PHASE DRIVE

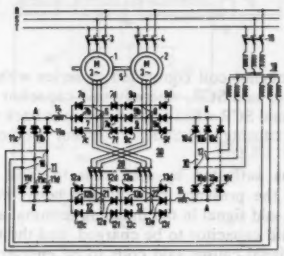
Harald Elger, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 15, 1975, Ser. No. 640,958

Claims priority, application Germany, Dec. 20, 1974, 2460639

Int. Cl.² H02D *7/36*

U.S. Cl. 318—45 **3 Claims**



1. A variable-speed three-phase drive for use with a three-phase network, said drive comprising:

first and second asynchronous motors each adapted to be connected to said network and each having a slip ring rotor;

first and second uncontrolled rectifiers, each of said rectifiers having a DC terminal connected to a DC terminal of the other and each having three-phase terminals connected to the rotor of a different one of said motors;

third and fourth uncontrolled rectifiers, each of said rectifiers having a DC terminal connected to a DC terminal of the other and each having three-phase terminals;

first and second inverters each having three-phase terminals adapted to be connected to said network, said first inverter having DC terminals which are connected with respective DC terminals of said first and said third uncontrolled rectifiers and said second inverter having DC terminals which are connected with respective DC terminals of said second and fourth uncontrolled rectifiers, whereby said first and second inverters and said first and second and said third and fourth uncontrolled rectifiers form a ring circuit;

and switch means for connecting together the three-phase terminals of the two uncontrolled rectifiers connected to the respective anode sides of said first and second inverters and for connecting together the three-phase terminals of the two uncontrolled rectifiers connected to the respective cathode sides of said first and second inverters.

4,032,825

COMMUTATING OSCILLATOR AND CURRENT-LIMITER FOR SOLID STATE SWITCHING CIRCUITS

Robert G. Klimo, Parma, Ohio, assignor to Cleveland Machine Controls, Inc., Cleveland, Ohio

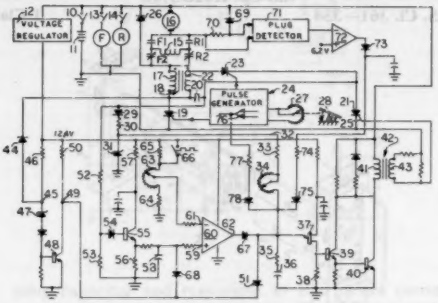
Filed Oct. 28, 1975, Ser. No. 626,501

Int. Cl.² H02P *5/16*

U.S. Cl. 318—139 **20 Claims**

1. In a system for controlling the power delivered to a load from a source of direct current and including a main silicon controlled rectifier through which load current can flow, a pulse generator for repeatedly gating the main silicon controlled rectifier into conduction at a controlled rate, a commutating capacitor which repeatedly charges to a commutating voltage, and a commutating silicon controlled rectifier which when gated into conduction will connect the commutating capacitor across the main silicon controlled rectifier, the improvement comprising:

a. means responsive to conduction of said main silicon con-



trolled rectifier for charging said commutating capacitor with said commutating voltage,

b. means responsive to the presence of a commutating charge on said commutating capacitor for producing a regulated voltage,

c. timing means actuated by said regulated voltage and having a time period,

d. means responsive to actuation of said timing means for gating the commutation silicon controlled rectifier into conduction at the end of said time period.

4,032,826

CIRCUIT ARRANGEMENT FOR PHASE-ALIGNMENT OF A SERVO DRIVE FOR A ROTARY SYSTEM

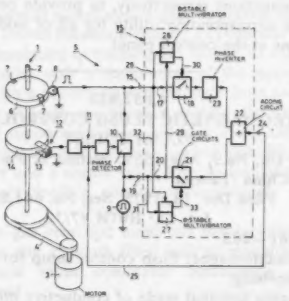
Uwe Jahnke, and Friedrich Sommer, both of Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,847

Claims priority, application Austria, Oct. 16, 1974, 8302/74

Int. Cl.² H02P *5/50*

U.S. Cl. 318—314 **4 Claims**



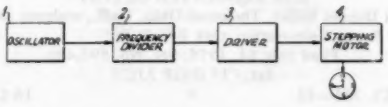
1. Circuit arrangement for phase-alignment of a servo drive for a rotary system, of the type wherein a speed control circuit including a phase detector which is controlled by an actual signal and a desired signal of which phase detector the output signal is applied to a correction element for correcting the speed of the rotary system via a transmission path which is provided for further processing of this signal, the actual signal and the desired signal being available as pulse-shaped signals,

whose respective pulses appear alternately in the desired condition of the system, the improvement comprising two gate circuits each comprising an input, an an output and at least one control input, a first signal path, a second signal path, the pulse-shaped actual signal being applied to the input of the first gate circuit via said first signal path, and the pulse-shaped desired signal being applied to the input of the second gate circuit via said second signal path, means for applying each pulse of the output signals from said first and second gate circuits to the transmission path in phase opposition, and a bistable multivibrator having a first input connected to the pulse-shaped actual signal and having a second input connected to the pulse-shaped desired signal, said bistable multivibrator providing a control signal depending on the timesequence of the pulses of the actual signal and of the desired signal, and means for applying said control signal to the control input of each gate circuit, whereby said control signal opens that gate circuit whose input signal contains more than one pulse between two consecutive pulses in the input signal of the other gate circuit.

4,032,827
DRIVER CIRCUIT ARRANGEMENT FOR A STEPPING MOTOR

Eduard Dobratz, Pfinztal-Berghausen, and Herbert Schwartz, Wurmberg, both of Germany, assignors to Timex Corporation, Waterbury, Conn.

Filed Mar. 15, 1976, Ser. No. 666,807
Int. Cl.² G04C *3/04*
U.S. Cl. 318—696 **10 Claims**



1. An apparatus for providing drive pulses to a stepping motor to correspond indexing to the number of control pulses generated by a control circuit, the apparatus comprising:

means connected to the stepping motor for generating an index-step signal in response to each index-step of the stepping motor;

drive pulse generator means connected to the stepping motor for initiating a drive pulse to the stepping motor in response to a control pulse and terminating the drive pulse in response to a corresponding index-step signal;

means responsive to the control pulses and the index-step signal for generating an inhibit signal in response to the presence of any index-step signals and the absence of a corresponding number of control pulses, the inhibit signal being removed following the corresponding number of control pulses; and

means connected to the drive pulse generator means being responsive to the inhibit signal for inhibiting at least one drive pulse to the stepping motor.

4,032,828
BATTERY BACK-UP SYSTEM FOR ELECTROMAGNETS

Fred A. Strobl, and Felix Di Legge, both of Chicago, Ill., assignors to Korhumel Industries, Inc., Chicago, Ill.

Filed Apr. 12, 1976, Ser. No. 676,533
Int. Cl.² H02J *9/00;* **H01F** *7/20*
U.S. Cl. 320—39 **7 Claims**

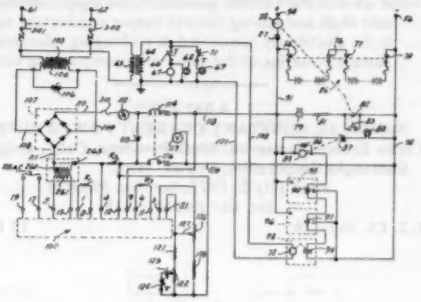
1. A battery back-up system for an electric magnet comprising:

a main power source connected to said magnet through a magnet controlier,

a battery means,

a unilateral current means connected between said battery means and said magnet such that if the voltage from said main power source drops below the battery voltage power will be supplied from said battery to said magnet,

including a battery charger and controls connected to said battery, and including a current sensing means connected between said battery and said magnet and a first warning device connected to said current sensing means to give a warning when current is supplied to said magnet from said battery, and means for preventing re-energization of

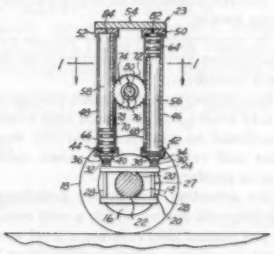


said magnet after said main power source voltage falls outside of a voltage range between preset maximum and minimum voltages and means maintaining said magnet energized by said battery means until it has been unloaded under the condition where said magnet was energized by said main power source and said main power source voltages falls out of said range after the magnet has been energized.

4,032,829
ROAD SHOCK ENERGY CONVERTER FOR CHARGING VEHICLE BATTERIES

Harold E. Schenavar, 18696 Inkster Road, Detroit, Mich. 48240

Filed Aug. 22, 1975, Ser. No. 607,032
Int. Cl.² B60K *25/10;* **B60L** *11/00*
U.S. Cl. 320—61 **2 Claims**



1. A road shock energy converter for charging storage batteries aboard a vehicle having a chassis with axles carrying ground wheels, said converter comprising

an axle coupling adapted to be secured to one of the axles,

a horizontal rotatable shaft adapted to be journalled in the vehicle chassis,

a first upstanding reciprocatory-to-rotary motion transformer including an elongated rack housing operatively connected to said coupling, a rack shorter than said rack housing slidably mounted therein for reciprocation relatively thereto, a pinion meshing with said rack, a unidirectional clutch drivingly connecting said pinion to said shaft whereby said motion transformer is responsive to the intermittent and irregular rectilinear thrusts received thereby from pavement irregularities by way of said axle

coupling to impart correspondingly intermittent and irregular and unidirectional torque thrusts to said shaft;

said shaft being operatively connected to driven relationship to said clutch,

a flywheel drivingly connected to said shaft for rotation unitarily therewith and thereby smoothing out the effects of said itermittent and irregular torque thrusts upon said shaft and consequently rendering more nearly regular and continuous the rotation of said shaft,

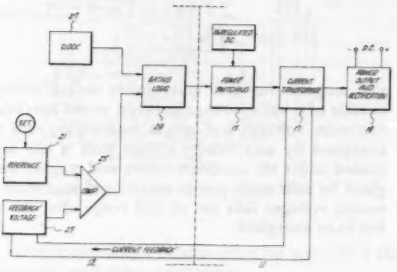
and an electric current generator drivingly connected to said shaft and having current output conductors adapted to be electrically connected in recharging relationship to storage batteries of the same or accompanying vehicle.

4,032,830

MODULAR CONSTANT CURRENT POWER SUPPLY

Carlos Ernesto Buonavita, South Pasadena, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed July 3, 1975, Ser. No. 593,070
Int. Cl.² H02M *3/335*
U.S. Cl. 363—25 **15 Claims**



1. A power supply for converting an unregulated D.C. voltage level to a desired constant current output comprising:

transforming means having input means for converting an A.C. signal supplied to said input means to a D.C. level;

power switching means for modulating said unregulated D.C. voltage level to produce an A.C. current waveform exhibiting successive ramps and connected to supply said A.C. current waveform to said input means of said transforming means;

means for developing a control voltage waveform comprising successive ramps proportional to those of said A.C. current waveform;

means for producing a reference voltage level and for setting said level such that each said control voltage ramp proportional to said A.C. current waveform normally crosses said reference level when said desired current output is produced; and

means for actuating said power switching means only for those intervals during which a said control voltage ramp does not exceed said reference level to control said A.C. current waveform such that a deviation from said desired constant current output level is corrected.

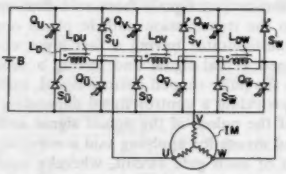
4,032,831

INVERTER APPARATUS

Akira Nabae; Takeo Shimamura; Ichirou Shimizu, all of Yokohama, and Ryoichi Kurosawa, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Nov. 24, 1975, Ser. No. 635,156
Int. Cl.² H02M *7/00*
U.S. Cl. 363—2 **10 Claims**

1. Inverter apparatus comprising a source of direct current, a plurality of parallel branch circuits connected across said source, each branch circuit including a pair of serially connected controllable switching elements, a plurality of semiconductor elements connected in parallel opposition with respective controllable switching elements, an alternating current load connected to the junctures between said pair of serially connected controllable switching elements, a D.C. reactor connected between said source of direct current and said alternating current load, means connected across said D.C. reactor for preventing attenuation of the current flowing through said D.C. reactor, and a source of control pulses for



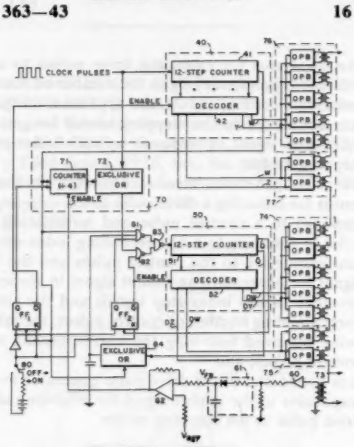
rendering ON respective controllable switching elements in a predetermined sequence each for a 120° interval of the output alternating current, said source of control pulse including means for chopping the current flowing through each controllable switching element at a predetermined modulation frequency for the former or latter 60° interval of said 120° interval.

4,032,832

DC TO AC INVERTER WITH UNREGULATED INPUT AND REGULATED OUTPUT

Frank Donald Miller, Thousand Oaks, Calif., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed July 14, 1975, Ser. No. 595,486
Int. Cl.² H02P *13/20*
U.S. Cl. 363—43 **16 Claims**



1. A DC to AC inverter for an unregulated DC voltage source comprising

two stepped waveform generating means connected to said source, each stepped waveform generating means being capable of delivering from said source one half the total desired voltage amplitude in the form of phase displaced, digitally controlled, stepped waveforms that approach a sine wave, each of said waveform generating means comprising a source of clock pulses at a substantially constant frequency and a step counter responsive to said clock pulses for timing said steps;

means for additively combining said stepped waveforms to produce an output voltage,

means for sensing said output voltage and producing a feedback signal proportional to its amplitude,

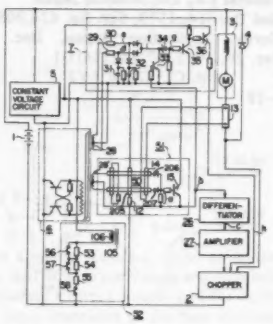
means for comparing said feedback signal with a reference signal to produce an error signal proportional to the difference therebetween, and

means responsive to said error signal for inhibiting said clock pulses from reaching the step counter of one of said two-stepped waveform generating means, thereby phase shifting the stepped waveform of one stepped waveform generating means relative to the other to reduce said error signal.

4,032,833
CHOPPER CONTROL DEVICE

Masahiko Ibamoto, and Hisakatsu Kiwaki, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 27, 1975, Ser. No. 544,269
Claims priority, application Japan, Feb. 6, 1974, 49-14454
Int. Cl.² H02M *7/44*; H02P *13/18*
U.S. Cl. 363—78 **6 Claims**



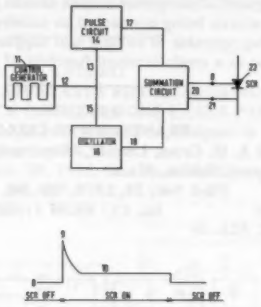
1. A chopper control device for controlling a duty cycle of a chopper, said device comprising a magnetic phase shifter having an iron core arrangement, said magnetic phase shifter including a control winding and a feedback winding each being wound around a portion of said iron core arrangement, the output of said magnetic phase shifter being utilized to provide a gate signal for controlling the duty cycle of said chopper, wherein said device further comprises means associated with said iron core arrangement of said magnetic phase shifter for applying an external magnetic field thereto, and means for regulating the intensity of the external magnetic field.

4,032,834
METHOD FOR TRIGGERING A CONTROLLED RECTIFIER AND FOR KEEPING IT CONDUCTIVE AND A GENERATOR FOR THAT PURPOSE

Hans Mogens Beierholm, Augustenborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 403,341, Oct. 3, 1973, abandoned.
This application Apr. 2, 1975, Ser. No. 564,269
Claims priority, application Denmark, Oct. 24, 1972, 5253/72
Int. Cl.² H02M *7/48*
U.S. Cl. 363—128 **2 Claims**

1. A circuit for controlling the supply of current to an inductive load, the circuit comprising: a controlled rectifier, of the type having a control electrode and a main current path, said inductive load being connected in series with said main current path; control generator means having an output; pulse generator means and signal generator means each having an input connected to said output of said control generator means, and each having an output; said pulse generator means further comprising a capacitor, means for charging said capacitor, a pulse transformer and means controlled by said generator means for discharging said capacitor through said pulse transformer; summing means having an input connected to said outputs of said pulse generator means and said signal generator means, and an output connected to said controlled rectifier; said pulse generator means being operative to supply to said control electrode via said summing means a short duration pulse of relatively large amplitude with high transconductance per unit of time to cause said main current path to become conducting and current to start to flow in said

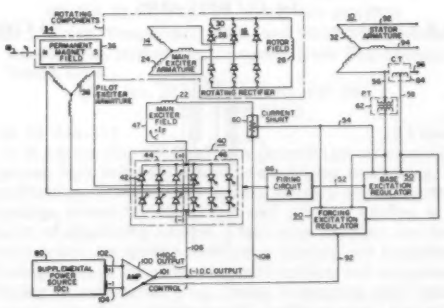


inductive load; and said signal generator means being operative to supply to said control electrode via said summing means a train of discrete pulses of relatively small amplitude, said supply of pulses being maintained at least until a predetermined current is flowing in said main current path and in said inductive load; and said circuit further comprising delay means connected between said output of said control generator means and said input of said signal generator means to delay supply of said pulse train to said control electrode until the amplitude of said short duration pulse is falling towards the amplitude of the pulses forming said train.

4,032,835
BRUSHLESS EXCITER SUPPLEMENTAL CEILING EXCITATION SYSTEM

Leonard W. Finnell, Forest Hills; Sigrud R. Petersen, North Huntingdon, and Dale I. Gorden, North Versailles, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 15, 1976, Ser. No. 666,813
Int. Cl.² H02P *9/14*
U.S. Cl. 322—86 **14 Claims**



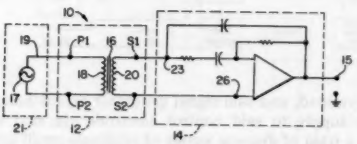
1. In a synchronous generator of the type having a rotating field winding turned by a prime mover, and wherein direct current excitation for said field winding is derived from said

prime mover by an exciter system including a pilot exciter having a permanent magnet rotor turned by said prime mover to permit operation of said generator at a first power output level which corresponds to a base mode of operation, the combination with said exciter system of a controlled source of direct current interconnected with said excitation system to supplement the excitation supplied to said rotating field winding to permit operation of said generator at a second power level which corresponds with a forcing mode of operation, and means operable to derive a control signal proportional to a predetermined function of the excitation applied to said field winding and of the power output of said generator, said controlled source being connected to receive said control signal and being operable to control said supplemental excitation in response to a predetermined function of said control signal.

4,032,836
TRANSFORMER CIRCUIT

Thomas A. O. Gross, Lincoln, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Nov. 28, 1975, Ser. No. 636,108
Int. Cl.² H03H *11/00*
U.S. Cl. 323—6 **4 Claims**



1. A transformer circuit comprising:

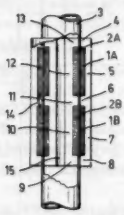
a transformer having a magnetic core with primary windings having first and second terminals and secondary windings having first and second terminals disposed on said core and presenting a complex impedance at said terminals of said secondary windings; and

impedance simulating means coupled to said terminals of said secondary windings for simulating a discrete element having a frequency dependent magnitude selected to resonate at a predetermined frequency with said transformer impedance at said secondary windings, whereby said transformer circuit attenuates signals at undesired frequencies.

4,032,837
CURRENT TRANSFORMER

Kalevi Panu, Vaasa, Finland, assignor to Oy Stromberg AB, Helsinki, Finland

Filed Feb. 10, 1976, Ser. No. 656,967
Claims priority, application Finland, Feb. 18, 1975, 750445
Int. Cl.² H01F *40/06*
U.S. Cl. 323—6 **4 Claims**



1. A current transformer comprising:

a tubular main insulator,

at least two first windings (either primary or secondary windings) arranged around the main insulator,

at least two second windings (either secondary or primary windings) arranged inside the main insulator preferably opposite corresponding first windings so that the pairs of windings formed in this way are, in the direction of the axis of the main insulator, at a distance from each other, whereby the primary windings are connected in series, and

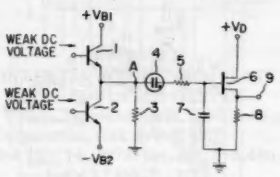
a magnetic circuit related to each pair of windings, comprising a first core portion that surrounds each first winding and the main insulator from the outside and has yoke portions, and a second core portion covering each second winding and the main insulator from the inside and has yoke portions,

wherein subsequent core portions have common intermediate yoke portions and the primary windings are arranged so as to magnetize both cores in the same direction.

4,032,838
DEVICE FOR GENERATING VARIABLE OUTPUT VOLTAGE

Shunji Minami, Moriguchi; Takehide Takemura, and Shunzo Oka, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 14, 1973, Ser. No. 424,905
Claims priority, application Japan, Dec. 30, 1972, 47-128493; Dec. 20, 1972, 47-147214[U]
Int. Cl.² G05F *3/12*
U.S. Cl. 323—19 **12 Claims**



10. A circuit for providing a variable control voltage, comprising means providing positive and negative voltages, a first terminal, first and second switching devices connected to apply said positive and negative potentials respectively to said first terminal, said first and second switching devices having control terminals whereby said positive and negative potentials can be selectively applied to said first terminal, an MOS field effect transistor, a neon tube and a resistor serially connected between said first terminal and the gate of said field effect transistor, said positive and negative potentials being greater than the threshold voltage of said neon tube, a non-polarized capacitor connected between the gate of said field effect transistor and ground potential, a source of drain potential connected to the drain electrode of said field effect transistor, and an output resistor connected between the source of said field effect transistor and ground potential.

4,032,839
CURRENT SCALING CIRCUITS

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,387
Claims priority, application United Kingdom, Aug. 26, 1975, 35173/75
Int. Cl.² G01K *7/00*; G05F *3/08*
U.S. Cl. 323—19 **25 Claims**

1. In combination:

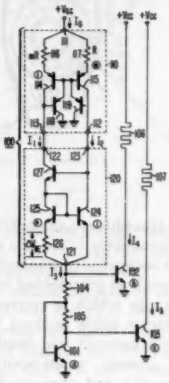
an input transistor and an output transistor, each having base and emitter electrodes with a base-emitter junction therebetween and each having a collector electrode, both arranged for operation at substantially the same absolute temperature T;

first and second resistances in substantially fixed ratio with each other despite change in their operating tempera-

tures, said first resistance being serially connected with the base-emitter junction of a first of said input and output transistors to form a first series combination, said first series combination being connected in parallel with the base-emitter junction of the second of said input and said output transistors to form a first parallel combination;

means responsive to said absolute temperature T for applying a potential proportional to T across said second resistance to cause a first current flow therethrough;

means responsive to said first current for supplying a second current, which is a substantially constant factor times said first current and is applied as an input current to said first parallel combination;



means for applying direct-coupled collector-to-base feedback to said input transistor to self-bias said input transistor, including a direct coupling of the collector electrode of said input transistor to the base electrode of said first transistor, for causing substantially the entire said input current to flow through said first resistance and through the collector-to-emitter path of said input transistor, developing a potential drop across said first resistance, which potential drop is proportional to T and determines the difference between the base-emitter potentials of said input and output transistors; and

means for utilizing the collector current flow of said output transistor as an output current, which output current is in substantially fixed proportion to said input current despite changes in T.

4,032,840

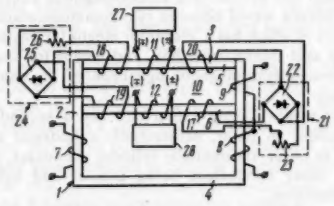
ADJUSTABLE TRANSFORMER

Vladimir Konstantinovich Lebedev, ulitsa Engelsa 25, kv. 12; Vladimir Alexandrovich Troitsky, ulitsa Bratislavskaya 8, kv. 86, and Semen Areflevich Kalinnikov, Brest-Litovsky prospekt 17, kv. 61, all of Kiev, U.S.S.R.

Filed July 17, 1975, Ser. No. 596,747

Int. Cl.² G05F 1/14

U.S. Cl. 323—48 **7 Claims**



1. An adjustable transformer comprising: a core having limbs and two yokes; at least one of said yokes comprising two parallel-connected controlled magnetic circuits, said magnetic circuits being in the form of closed magnetic conductors and comprising controlled yokes; primary and secondary power windings mounted on said limbs; a supplemental section of turns of at least one of said power windings arranged between said controlled yokes; a control circuit; bias windings disposed on said controlled yokes and connected to said control circuit; said bias windings ensuring magnetic switching of said supplemental section of turns of said power winding, said magnetic switching being a movement of said supplemental section of turns of said power winding in and out of the open-circuit magnetic flux field of said disconnectable transformer.

4,032,841

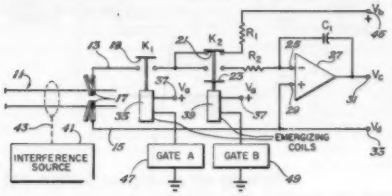
METHOD AND APPARATUS FOR MEASURING THE CAPACITANCE OF TELEPHONE CABLE PAIRS

Gary H. Knippelmier, Round Rock, Tex., assignor to A. P. C. Industries, Inc., Austin, Tex.

Filed Nov. 28, 1975, Ser. No. 636,309

Int. Cl.² G01R 27/26

U.S. Cl. 324—60 CD **6 Claims**



1. Apparatus for measuring the capacitance of telephone cable pairs, comprising:

a. means for charging through a charging resistance a selected cable pair, the capacitance of which is to be measured, to a first predetermined voltage;

b. means for discharging said cable pair through a discharge resistance from said first predetermined voltage to a second predetermined voltage;

c. said charging resistance being substantially equal to said discharge resistance, and the discharge time being substantially equal to a period of an interference frequency to be rejected;

d. means for integrating the discharge current, whereby there is produced an output voltage which is a substantially linear function of the capacitance of said selected cable pair.

4,032,842

SPARK PLUG TESTER IGNITION SYSTEM

Sam J. Green, Temperance, Mich., and Richard E. Callahan, Toledo, Ohio, assignors to Champion Spark Plug Company, Toledo, Ohio

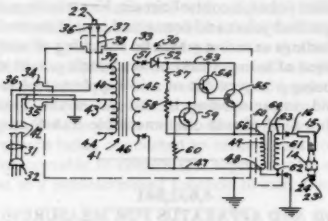
Filed Jan. 28, 1976, Ser. No. 653,092

Int. Cl.² F02P 17/00

U.S. Cl. 324—15 **10 Claims**

1. In a spark plug test fixture, an improved power supply for applying high voltage pulses to a spark plug comprising, in combination, a transformer having primary and secondary windings, means for connecting said primary winding to a source of alternating current, a half wave rectifier, an electronic switch, an ignition coil having primary and secondary windings, means for connecting said ignition coil secondary winding to such spark plug, means connecting said transformer secondary winding, said rectifier, said electronic switch and said ignition coil primary winding in a closed series circuit whereby, when said electronic switch is closed, half cycles of a predetermined polarity are applied from said transformer secondary winding through said diode and said elec-

tronic switch to said ignition coil primary winding, and means for periodically opening said electronic switch to establish a

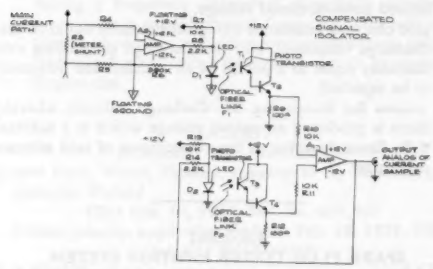


high voltage across said ignition coil secondary winding for application to such spark plug.

4,032,843
COMPENSATED SIGNAL ISOLATOR

Richard S. Loucks, Northridge, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 21, 1976, Ser. No. 698,128
Int. Cl.² G01R *31/00*
U.S. Cl. 324—96 **12 Claims**



1. A device for monitoring an electrical parameter associated with a common-mode voltage, said device generating an analog signal independent of said common-mode voltage and representing said electrical parameter at a remote location, comprising:

a sensor responsive to said electrical parameter to provide a first electrical signal as a first function thereof;

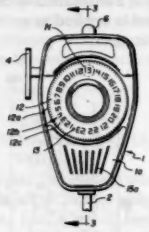
first means comprising a first optically coupled isolator responsive to said first electrical signal for generating a second signal representative of said first signal at a remote location independent of said common-mode voltage;

and second means responsive to said second signal including a second optically coupled isolator substantially identical to said first isolator, said second isolator being connected in a feedback arrangement within said second means in a manner compensating said second signal for variations in the transfer function of said first isolator.

4,032,844
COMBINATION MICROPHONE, SPEAKER, AND CONTROL UNIT FOR A RADIO TRANSCEIVER

Kazuyoshi Imazeki, Tokyo, Japan, assignor to General Research of Electronics, Inc., Tokyo, Japan

Filed Dec. 22, 1975, Ser. No. 643,485
Claims priority, application Japan, Dec. 28, 1974, 50-4318[U]
Int. Cl.² H01B *1/38*
U.S. Cl. 325—15 **15 Claims**



1. A combination transducer and control unit adapted to be coupled by a multi-conductor cable to a separate radio transceiver chassis which is capable of transmitting and receiving a plurality of radio signals at preselected frequencies, comprising: a housing of a size which is conveniently held by one hand; a multi-conductor cable secured to said housing and adapted to electrically connect said combination unit to said radio transceiver chassis; multi-position switch means mounted in said housing and connected to said cable, said switch means being operable to select individually said preselected frequencies; illuminated channel indicating means mounted on said housing and responsive to said switch means for indicating the frequency to which said transceiver is turned; an electromechanical transducer mounted in said housing and connected to said cable transmit/receive switch means mounted on said housing and coupled to said cable and said transducer for selectively enabling said transceiver to transmit or receive said radio signals; and volume control means mounted on said housing and coupled to said cable and said transducer for varying the amplitude of the audio frequency electrical signals produced by said transceiver; said frequency-selecting switch means, transmit/receive switch means, and volume control means each being located on said housing so as to be operable by the finger of the same hand of the operator which is holding the unit.

4,032,845
SURFACE WAVE COMMUNICATION SYSTEM

Lester C. Vla, Falls Church, Va., assignor to Automation Industries, Inc., Silver Spring, Md.

Filed June 19, 1975, Ser. No. 588,459
Int. Cl.² H01B *1/38*; H04B *1/04*
U.S. Cl. 325—16 **5 Claims**

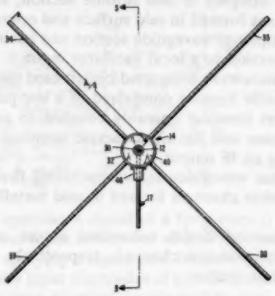
1. In a surface wave communication system, a length of transmission line for carrying electromagnetic eneergy in the form of surface waves between two communication stations, at least one of which has a, dispenser means for paying out and taking up said transmission line, and means for transmitting and receiving electromagnetic signal energy, the improvement comprising:

coupler means having a first end and a second end and including an inner, substantially cylindrical conductor and an outer, substantially cylinder conductor, said inner and outer conductors being coaxial and substantially coextensive;

wave open circuit and wave short circuit support means located at said first and second ends, respectively, of said coupler means mounting said inner conductor coaxially on said outer conductor and allowing electromagnetic

wave energy to pass through substantially only said first end of fsaid coupler means;

means including a central aperture extending axially through said inner conductor for slidably mounting said coupler means on said transmission line, said inner conductor being contiguous to and circumferentially surrounding said transmission line to allow said transmission



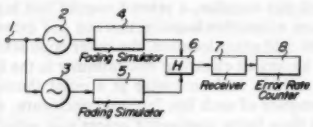
line to pass freely therethrough, whereby the dispenser means can pay out or take up said transmission line through said coupling means; and

coaxial conductor means electrically connecting said transmitting and receiving means to the midpoint of said coupler means whereby said signal energy is coupled between said transmission line and said transmitting and receiving means by way of said first end of said coupler means.

4,032,846
DIGITAL MOBILE COMMUNICATION SYSTEM AND METHOD

Kenkichi Hirade, Yokosuka; Takeshi Hattori, Yokohama, and Hiromi Wasai, Kashiwa, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Oct. 8, 1975, Ser. No. 620,622
Claims priority, application Japan, Oct. 9, 1974, 49-116412
Int. Cl.² H04H *3/00*
U.S. Cl. 325—54 **4 Claims**



1. In a digital mobile communications system of the type wherein the same transmission signal is simultaneously transmitted in each of a plurality of transmission zones on a common standard carrier whose frequency is located within a single radio channel bandwidth for all of the transmission zones in the system, and wherein adjacent transmission zones overlap, the improved method of transmission comprising choosing first and second nominal center carrier frequencies for two adjacent transmission zones, respectively, which overlap, such that the difference between said first and second carrier frequencies is a value between $\Delta fmin$ and $\Delta fmax$, such value being very small compared to the standard carrier frequency, and being selected to achieve a predetermined minimum error rate of reception in the overlapped zone, and wherein the following relationships are satisfied:

$$fi - fio \quad \Delta fsi;$$
$$fj - fjo \quad \Delta fsj;$$

and

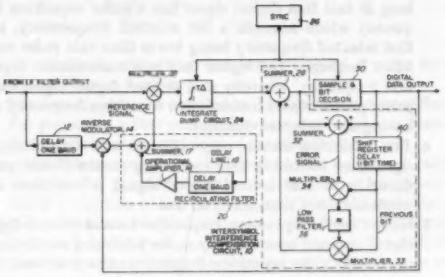
$$\Delta fmin \quad \Delta fij \quad \Delta fmax;$$

where Δfij is the frequency shift between said first and second frequencies having respective nominal center frequencies fio and fjo, instantaneous center frequencies fi and fj, and allowable frequency fluctuations Δfsi and Δfsj.

4,032,847
DISTORTION ADAPTER RECEIVER HAVING INTERSYMBOL INTERFERENCE CORRECTION

Manfred G. Unkauf, Franklin, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Jan. 5, 1976, Ser. No. 647,261
Int. Cl.² H03K *9/00*
U.S. Cl. 325—323 **21 Claims**



17. The method comprising the steps of:

producing a signal representing the integral of detected received signals, said received signals comprising a series of pulses, each of said pulses representing a discrete digital state;

producing an output signal representing the discrete digital states of said received signals;

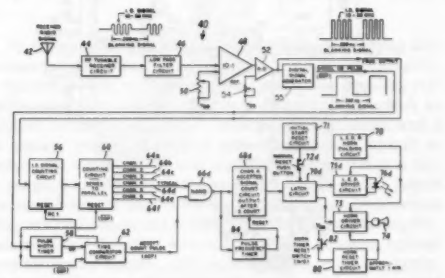
producing an error signal representing the difference between said output signal and said signal representing said integral of detected received signals; and

producing a correcting signal in response to said error signal.

4,032,848
RECEIVER FOR A CODED ELECTRONIC SECURITY SYSTEM

Frank J. Shaughnessy, Hartford, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed July 31, 1975, Ser. No. 600,901
Int. Cl.² H04B *1/16*
U.S. Cl. 325—325 **14 Claims**



1. A receiver, usable in an electronic security system which includes at least one transmitter for selectively transmitting a pulse coded signal comprising a series of transmissions, repeated at a selected transmission repetition frequency, each transmission having a selected duration and comprising a

plurality of pulses at a selected pulse repetition frequency, comprising:

a. means for receiving and demodulating said signal to obtain a first digital signal comprising digital pulses at said selected pulse repetition frequency;

b. a digital counter for counting the number of pulses in said first digital signal during a predetermined time interval and providing an output representative of the range of said pulse repetition frequency;

c. indicator means, responsive to said counter output, for indicating that a signal has been received which contains pulses having a pulse repetition frequency within a predetermined range;

d. a digital signal generator responsive to said first digital signal, for providng a scond digita signal, said digital signal generator providing a continuous output pulse as long as said first digital signal has a pulse repetition frequency which exceeds a fist selected frequemncy, said first selected frequency being lower than said pulse repetition frequency and higher than said transmission repetition frequency, whereby said second digital signal comprises pulses at said transmission repetition frequency and having said selected duration

e. first inhibiting means, responsive to said second digital signal, for inhibiting said indicating means if said pulse duration of said second digital signal is less than said predetermined time interval; and

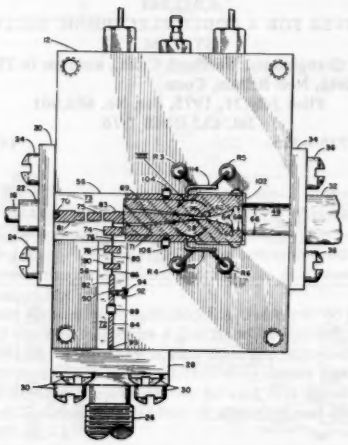
f. second inhibiting means, responsive to said second digital signal and said counter output, for inhibiting said indicating means if the repetition frequency of said second digital signal or said counter output is less than a second selected frequency.

4,032,849

PLANAR BALANCED MIXER/CONVERTER FOR BROADBAND APPLICATIONS

Ulrich H. Gysel, Mountain View, and Ashok K. Gorwara, San Jose, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 1, 1976, Ser. No. 719,884
Int. Cl.² H04B 1/26
U.S. Cl. 325—446 **8 Claims**



1. A millimeter wave single balanced mixer comprising:

a metallic housing;

an RF input port formed in said metallic housing comprised of a section of waveguide having first and second broadwalls;

a first microwave integrated circuit card disposed within said section of waveguide;

said card including a dielectric substrate having a metallized surface, a waveguide to slotline transition formed on said substrate and having a first end juxtapose to said RF port, a slotline transmission section disposed in said surface operably coupled to said waveguide to slotline transition, a coplanar waveguide section formed in said surface and operably coupled to said slotline section, and bandpass filter means formed in said surface and operably coupled to said coplanar waveguide section and having a terminal for connection to a local oscillator input;

a second microwave integrated circuit card disposed within said metallic housing comprised of a low-pass filter having a first terminal operably coupled to said bandpass filter means and having a second terminal adapted for providing an IF output;

said coplanar waveguide section including first and second transmission channels formed in said metallized surface; and

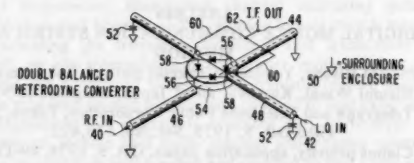
first and second diodes connected across said first and second transmission channels, respectively, juxtapose to said slotline section.

4,032,850

COAXIAL BALUN WITH DOUBLY BALANCED HETERODYNE CONVERTER

Joseph Caldwell Hill, N. Billerica, Mass., assignor to Varian Associates, Palo Alto, Calif.

Filed Jan. 12, 1976, Ser. No. 648,065
Int. Cl.² H04B 1/26; H03D 7/14; H02M 5/20
U.S. Cl. 325—446 **8 Claims**



6. A heterodyne converter comprising a conductive enclosure, a first coaxial line leading into said enclosure at one location thereon and extending within said enclosure to a wall opposite said one location, a second coaxial line leading into said enclosure at another location thereon and extending to a wall opposite said other location, the outer conductor of each coaxial line having an electrical discontinuity in the form of an annular gap within said enclosure at a point therein spaced from the entrance of such line into said enclosure, a first pair of balanced lines being connected across said annular gap in said first coaxial line, a second pair of balanced lines being connected across said annular gap in said second coaxial line, a diode bridge positioned within said enclosure, said first and second pairs of balanced lines being connected to opposite corners of said bridge, and means for supplying a heterodyned output signal from said bridge.

4,032,851

COMPLEMENTARY SYMMETRY FET MIXER CIRCUITS

Merle Vincent Hoover, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 7, 1976, Ser. No. 684,405
Int. Cl.² H04B 1/28
U.S. Cl. 325—451 **9 Claims**

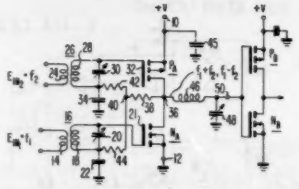
1. A mixer circuit comprising, in combination:

two terminals between which an operating voltage may be applied;

two field effect transistors of complementary conductivity types, each having an input electrode, an output elec-

trode, a conduction path between these electrodes, and a control electrode, said two paths being connected to one another at their output electrodes, and said two paths being connected in series between said terminals;

means for quiescently biasing both control electrodes to quiescently operate both transistors in the linear region of their operating range;



means for applying a signal at a frequency f_1 between the control and input electrodes of said first transistor;

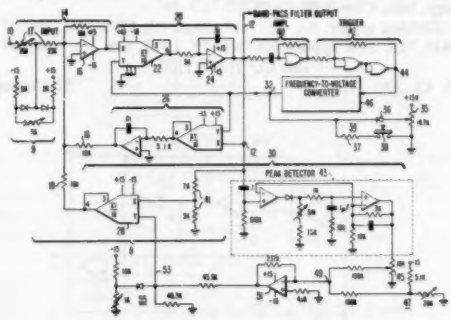
means for applying a signal at a frequency f_2 between the control and input electrodes of said second transistor; and

a circuit output terminal connected to said output electrodes for supplying signals at a sum frequency $(f_1 + f_2)$ and a difference frequency $(f_1 - f_2)$.

4,032,852
FILTER WHICH TRACKS CHANGING FREQUENCY OF INPUT SIGNAL

Leonard Robin Hulls, Marblehead, and Stephen Clow Hadden, Cambridge, both of Mass., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,389
Int. Cl.² H03B 1/04
U.S. Cl. 328—167 **4 Claims**



1. A band-pass filter having a frequency pass band which tracks the changing frequency of an input signal, comprising

a voltage-controlled filter including a signal input terminal, a signal output terminal and a frequency control terminal,

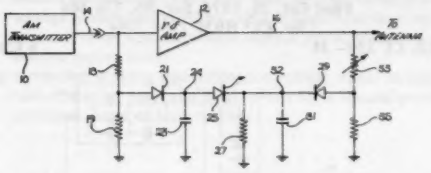
a frequency-to-voltage converter coupled from said signal output terminal to said frequency control terminal to cause the pass band frequency of the filter to track the frequency of the input terminal signal, and

means coupled from said signal output terminal to said signal input terminal to cause the Q of the filter to vary in an inverse relation with the amplitude of the input signal.

4,032,853
OVERDRIVE DETECTOR FOR RADIO FREQUENCY AMPLIFIER

Eugene B. Hibbs, Jr., 1206 Fernside Drive, La Canada, Calif. 91001

Filed Oct. 28, 1976, Ser. No. 736,385
Int. Cl.² G01R 19/00
U.S. Cl. 330—2 **11 Claims**



1. A circuit for detecting the overdriving of a radio frequency amplifier comprising:

a first detection means coupled to the input of said amplifier for providing a first potential, which potential is a function of the input signal to said amplifiers;

a second detection means coupled to the output of said amplifier for providing a second potential, which potential is a function of the output signal from said amplifier;

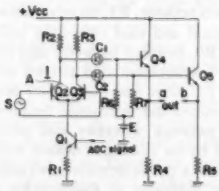
threshold means coupled between said first and second potentials for providing a current path when the difference between said first and second potential exceeds a predetermined voltage;

whereby current in said threshold means provides an indication of the overdriving of said amplifier.

4,032,854
AMPLIFICATION AND GAIN CONTROL CIRCUIT

Seiji Miyamoto, Yao, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Mar. 12, 1976, Ser. No. 666,509
Claims priority, application Japan, Mar. 12, 1975, 50-33833[U]
Int. Cl.² H03G 3/30
U.S. Cl. 330—29 **5 Claims**



1. In an amplification circuit for receiving alternating current input signals, said circuit comprising at least one amplifying element and at least one output circuit, for coupling said amplification circuit to a subsequent stage through which an amplified output is supplied to said subsequent stage, and a gain control means to control said amplification circuit to maintain the amplitude of said amplified output within a certain range, an amplification and gain control circuit which includes at least one capacitive semiconductor junction means having one end connected to an output electrode said amplifying element and the other end connected to a constant voltage source through a resistor, said constant voltage source applying a reverse bias to said semiconductor junction means and also applying a D.C. bias to said subsequent stage wherein said semiconductor junction means prevents variations in D.C. voltage in the amplification circuit from being applied to said subsequent stage, and wherein the capacitance of said semiconductor junction means is decreased upon actuation of said

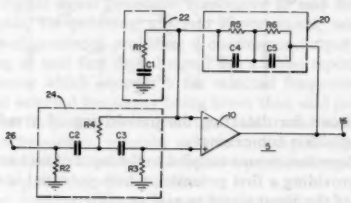
gain control means to decrease gain by said amplification circuit whereby attenuation of the output of said amplification circuit is enhanced.

4,032,855

PHONOGRAPH PREAMPLIFIER NETWORK WITH INFRASONIC CUTOFF RESPONSE

Tomlinson M. Holman, II, Cambridge, Mass., assignor to Advent Corporation, Cambridge, Mass.

Filed Oct. 28, 1976, Ser. No. 736,404
Int. Cl.² H03F 1/34, 3/04
U.S. Cl. 330—31 **6 Claims**



1. An audio signal preamplifier network having a preamplifier input terminal for coupling to a magnetic phonograph cartridge, and having a preamplifier output terminal, comprising:

A. a high gain amplifier having inverting and non-inverting input terminals and an output terminal, said input terminals being characterized by relatively high impedance, and said amplifier output terminal being coupled to said preamplifier output terminal,

B. equalization feedback network coupled between said amplifier output terminal and said inverting terminal,

C. an RC filter network characterized by a single real axis pole and including a first resistor, R1, and first capacitor, C1, coupled in series between said inverting input terminal and a reference potential,

D. an input filter feedback network characterized by a pair of off-axis complex poles, and including second and third capacitors, C2 and C3, respectively, coupled in series between said preamplifier input terminal and said non-inverting input, a second resistor, R2, coupled between said preamplifier input terminal and said reference potential, a third resistor, R3, coupled between said non-inverting terminal and said reference potential, and a fourth resistor, R4, coupled between said inverting terminal and the junction between said second and third capacitors,

wherein said RC filter and input filter feedback networks are adapted to control the infrasonic frequency response of said preamplifier network whereby said preamplifier network is characterized by an 18dB per octave roll-off response at frequencies below a predetermined infrasonic frequency and a relatively flat response at frequencies in a predetermined range adjoining and above said predetermined infrasonic frequency.

4,032,856

DRIFT COMPENSATED AMPLIFIER, PARTICULARLY FOR MEASURING SIGNALS

Heinz-Dieter Goldner, Schwalbach, Taunus, Germany, assignor to Hartmann & Braun Aktiengesellschaft, Frankfurt am Main, Germany

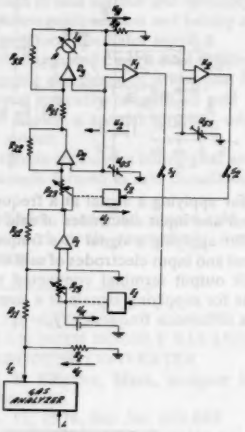
Filed Nov. 10, 1975, Ser. No. 630,335
Claims priority, application Germany, Nov. 13, 1974, 2453720
Int. Cl.² H03F 3/45
U.S. Cl. 330—69 **13 Claims**

9. A drift compensated amplifier comprising a first differential amplifier connected to receive the measuring signal and having an input circuit which includes a first adjustable bias;

a second differential amplifier with adjustable gain, having one input connected to receive the output of the first differential amplifier, the second differential amplifier having an output circuit;

a second bias connected to the other input of the second differential amplifier;

first circuit means connected to the output circuit of the second amplifier and operating the first adjustable bias so that for a first particular measuring signal the output of



the second differential amplifier is determined exclusively by the second bias while the gain circuit has zero volts so that the output of the second differential amplifier is independent from the adjusted gain; and

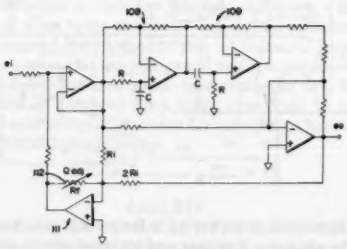
second circuit means connected to the output circuit of the second amplifier and operating the gain so that for a second particular measuring signal the second differential amplifier has a second particular output.

4,032,857

FILTER CIRCUIT

Jack G. S. Lum, Sunnyvale, Calif., assignor to Sound Technology, Inc., Campbell, Calif.

Division of Ser. No. 509,118, Sept. 25, 1974, Pat. No. 3,940,715. This application Oct. 29, 1975, Ser. No. 626,761
Int. Cl.² H03F 1/00
U.S. Cl. 330—151 **12 Claims**



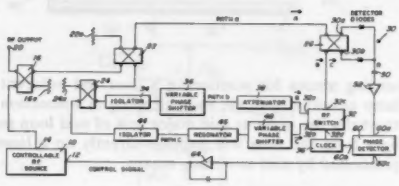
11. Bandpass filter means comprising first and second series connected all pass phase shifter means, said first phase shifter means shifting the phase of a signal of a predetermined frequency +90° and said second phase shifter means shifting the phase of said signal −90° whereby a 0° shift is provided, said filter means shifting signals offset from said predetermined frequency a different degree, and having an input for receiving said signal and an output at which said signal is shifted 180° in

phase, and means for directly summing said input to said output.

4,032,858
AUTOMATIC FREQUENCY CONTROL SYSTEM

Robert Norman Hargis, Wheaton, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 3, 1976, Ser. No. 692,698
Int. Cl.² H03B 3/04
U.S. Cl. 331—9 14 Claims

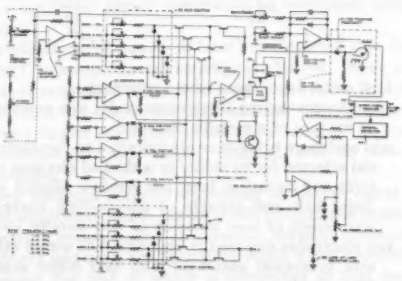


1. An automatic frequency control system for maintaining a controllable oscillator at a center frequency f_0 comprising:
a detector means having a pair of inputs and an output;
a first coupling circuit means for coupling the oscillator signal to the first detector input;
a second coupling circuit means having a predetermined transfer characteristic selected responsive to the first coupling circuit;
a third coupling circuit means comprising a resonant component tuned to f_0;
switching means for alternately coupling the oscillator signal through the second and third coupling circuits to the second detector input; and
processing means for processing the detector AC output and controlling the oscillator in response thereto.

4,032,859
1 TO 18 GHZ MICROWAVE SIGNAL GENERATOR

Marvin L. Ryken, Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 2, 1976, Ser. No. 719,780
Int. Cl.² H03B 19/00
U.S. Cl. 331—53 10 Claims

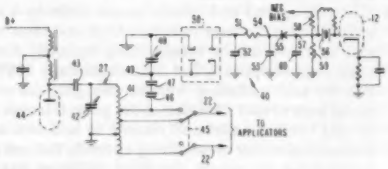


1. A wideband microwave signal generator having stable frequency adjustment and leveled output power across its frequency range comprising:
a. frequency control means for generating a variable DC voltage signal across a predetermined voltage range;
b. means for producing a microwave signal having a series of frequency swings across a first predetermined frequency range as said variable DC voltage is varied across said predetermined voltage range;
c. multiplier means for generating harmonics from said microwave signal and filtering selected harmonics in response to a filter tracking voltage to produce a microwave output signal;
d. means for varying offset and gain of said variable DC voltage to produce said filter tracking voltage;
e. means for comparing output power of said microwave output signal with a desired power level signal to generate a difference voltage signal;
f. means for applying said difference voltage signal to said means for varying offset and gain of said variable DC voltage to vary said filter tracking voltage until the output power level of said microwave output signal matches said desired power level;
g. means for limiting said difference voltage signal to cause said multiplier means to track over only a second predetermined range of frequencies.

4,032,860
RADIO FREQUENCY POWER GENERATOR HAVING ADJUSTABLE STABILIZED OUTPUT LEVEL AND FAIL-SAFE CONTROL CIRCUITS

Harry H. LeVeen, 800 Poly Place, Brooklyn, N.Y. 11209

Filed July 11, 1975, Ser. No. 595,095
Int. Cl.² A61N 1/40; H02H 7/20; H03B 3/02
U.S. Cl. 331—63 1 Claim



1. In a system for applying radio frequency electrical power of selectable level to a load which includes:
a radio frequency electrical signal source having an input circuit and an output circuit for generating a radio frequency electrical signal in said output circuit, the amplitude of said signal in said output circuit being a function of the amplitude of a control signal applied to said input circuit, radio frequency power amplifier means having an input circuit and an output circuit for generating a radio frequency electric signal in said output circuit of said amplifier means having a power level which is a function of the amplitude of a radio frequency signal applied to said input circuit of said amplifier means, and said output circuit of said signal source being coupled to said input circuit of said amplifier means, the improvement in which said output circuit of said amplifier means is coupled to said input circuit of said signal source through a negative feedback servo loop including sensing means connected to said output circuit of said amplifier means for sensing the radio frequency power level in said output circuit of said amplifier means, said sensing means including manually operated control means and being connected to said input circuit of said signal source for connecting a portion of the sensed output level as a control signal for said signal source, said portion being controlled by said control means, and a high voltage supply connected to an external power source, means connecting said high voltage supply to said signal source, current sensitive means in said connecting means responsive to an increase therein above a preselected maximum to interrupt the connection between said external power source and said high voltage supply to disable said high voltage supply.

4,032,861
LASER DEVICE FOR ALTERING SURFACES IN ACCORDANCE WITH GIVEN PATTERNS

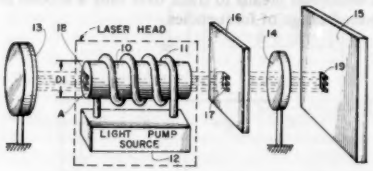
Larry R. Rothrock, Poway, Calif., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 416,236, Nov. 15, 1973, abandoned, which is a continuation of Ser. No. 226,548, Feb. 15, 1972, abandoned, which is a continuation of Ser. No. 51,798, July 2, 1970, abandoned. This application July 16, 1975, Ser. No. 596,262

The portion of the term of this patent subsequent to Apr. 18, 1989, has been disclaimed.

Int. Cl.² H01S 3/08

U.S. Cl. 331—94.5 C **9 Claims**



1. A laser device for altering the surface of a target material disposed at a fixed position exterior to said laser device to define a given pattern on said surface comprising, in combination:

a. a high gain laser material and means for optically pumping said laser material;

b. first and second end mirror means defining a resonant optical cavity for laser radiation from said laser material, said first end mirror means being optically flat or the equivalent of optically flat and substantially 100% reflective for laser radiation without changing the cross-sectional area of said radiation at the point it leaves one end of said laser material and returns to said one end, said second end mirror means being optically flat and partially transmissive to couple the laser radiation out of said optical cavity; and

c. a mask having cut-out portions defining a given pattern, said mask being positioned in said optical cavity such that only cross-sectional portions in said laser material which are congruent with each other and similar to said given pattern are stimulated to emit output laser radiation, whereby said exterior target surface may be radiated by said output laser radiation to thereby effect physical alteration of said surface similar to said given pattern.

4,032,862
HIGH POWER ELECTRODELESS GAS ARC LAMP FOR PUMPING LASERS

David A. Huchital, Trumball, and George N. Steinberg, Westport, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 442,976, Feb. 14, 1974, Pat. No. 3,909,736. This application June 17, 1975, Ser. No. 587,670

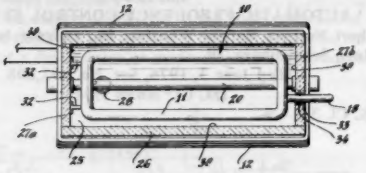
Int. Cl.² H01S 3/092

U.S. Cl. 331—94.5 P **14 Claims**

1. An electrodeless cw arc lamp for pumping a laser comprising:

a radiation transparent lamp envelope in the form of a closed loop having a continuous bore, a major axis and a minor axis, the bore diameter being in the range of from about 1 to about 10 mm, said envelope containing an inert ionizable gas at a cold pressure of from about 0.5 to about 20 atmospheres, said major axis of the loop corresponding substantially to the length of the laser rod to be pumped by the lamp;

a coil surrounding said lamp envelope with no portion thereof being disposed between said envelope and the laser rod to be pumped thereby, said coil being adapted to receive an RF current and produce a flux in response thereto, said coil being disposed so that said lamp envelope is in the flux; and



mounting means for positioning a laser rod adjacent said lamp envelope with the rod extending in a direction substantially the same as said major axis of said loop so that light from the tube will impinge directly on a laser rod positioned by said mounting means.

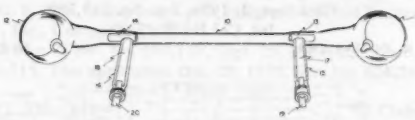
4,032,863
METAL VAPOR LASER TUBE

Daniel E. Altman; Glidden J. Barstow, and Myer Geller, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 19, 1976, Ser. No. 678,264

Int. Cl.² H01S 3/03

U.S. Cl. 331—94.5 D **6 Claims**



1. A metal vapor laser tube comprising:

an enclosure having an elongate major axis and containing an amount of a metallic element,

said enclosure being of an electrically non-conductive material selected for its ability to withstand elevated temperatures and having at least one window aligned with said major axis and capable of transmitting energy at the wavelength of laser emission of said metallic element;

two electrodes disposed at opposite ends within said enclosure in coaxial alignment with said major axis of said enclosure;

an extension proximate to each electrode and orthogonally disposed relative to said major axis of said enclosure;

an electrical conductor connected to each electrode and sealed within substantially the entire length of each extension,

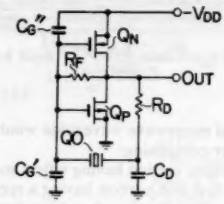
said electrical conductor being of strip configuration and having a substantially elongate elliptical cross-section; and

a terminal connected to each said electrical conductor and extending from the external sealed end of each extension for connection to a source of electrical energy.

4,032,864
ELECTRONIC CIRCUIT HAVING A MISFET AS AN AMPLIFYING ELEMENT

Osamu Yamashiro, Kodaira, and Yoshikazu Hatsukano, Hachioji, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 13, 1976, Ser. No. 658,067
Claims priority, application Japan, Feb. 28, 1975, 50-24014
Int. Cl.² H03B 5/36; H03F 3/16
U.S. Cl. 331—116 R 4 Claims



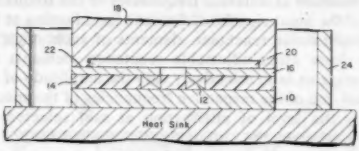
1. An electronic circuit comprising an amplifier circuit including:
input and output terminals;
a power voltage terminal;
a ground terminal;
at least on insulated gate field effect transistor as an amplifying element, said field effect transistor having its gate, drain and source connected to said input, output and ground terminals respectively;
a bias resistor provided between said input and output terminals; and
first and second capacitive elements series-connected between said power voltage terminal and said ground terminal, a divided voltage of a power voltage determined by said first and second capacitive elements being selected to be equal to a bias voltage determined by said bias resistor, said divided voltage being applied to said input terminal.

2. An electronic circuit comprising an oscillation circuit including:
an amplifier circuit having at least one insulated gate field effect transistor as an amplifying element, input and output terminals, and a bias resistor provided between said input and output terminals, said field effect transistor having its gate connected to said input terminal, its drain connected to said output terminal and its source grounded;
positive feedback means for coupling an output signal of said amplifier circuit to the input side thereof, said positive feedback means having an inductive element connected between said input and output terminals, a first capacitive element one end of which is connected to said input terminal and the other end of which is grounded, and a second capacitive element one end of which is connected to said output terminal and the other end of which is grounded; and
a third capacitive element connected between a power voltage terminal and said input terminal for dividing a power voltage in cooperation with said first capacitive element, a divided voltage of said power voltage determined by a ratio between the capacitances of said first and third capacitive elements being selected to be equal to a bias voltage determined by said bias resistor.

4,032,865
RADIAL IMPEDANCE MATCHING DEVICE PACKAGE

Robert S. Harp, Westlake Village, and Kenneth J. Russell, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 5, 1976, Ser. No. 664,346
Int. Cl.² H01P 1/16, 5/10, 1/04; H03B 9/12
U.S. Cl. 333—21 R 16 Claims

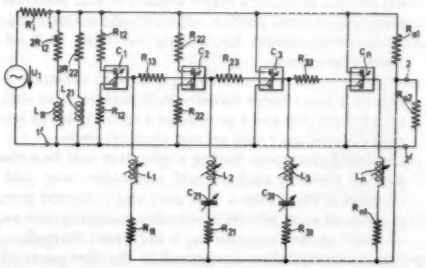


1. An active transmission line structure for transforming the relatively low impedance of a semiconductor device to a high impedance suitable for coupling to external microwave circuitry, including, in combination:
a. an active semiconductor device having an annular configuration with first and second opposed surfaces,
b. a first metal layer adjacent said first device surface and extending radially therefrom,
c. a second metal layer disposed on said second device surface and having a radial dimension which is substantially coextensive with a corresponding radial dimension of said first metal layer, and
d. a non-conducting wave propagating material between said first and second metal layers and adjacent said semiconductor device, and forming with said first and second metal layers a radial transmission line for transforming the relatively low impedance of said semiconductor device to a predetermined higher impedance at a predetermined radial distance away from said semiconductor device, whereby said radial transmission line may be connected at or near its periphery to other higher impedance microwave circuits and with good impedance matching characteristics.

4,032,866
LOW LOSS FREQUENCY RESPONSE CORRECTIVE NETWORK

Hans-Joachim Schmidt, Nurnberg, Germany, assignor to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH, Nurnberg, Germany

Filed Mar. 12, 1976, Ser. No. 666,229
Claims priority, application Germany, Mar. 22, 1975, 2512805
Int. Cl.³ H03H 7/10, 7/16, 7/38; H04B 03/14
U.S. Cl. 333—28 R 16 Claims



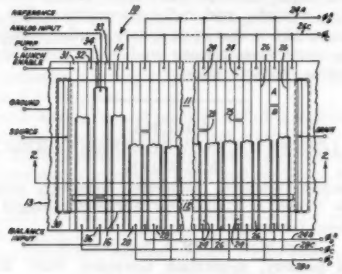
1. A corrective equalizer network for obtaining a desired attenuation versus frequency characteristic, comprising a source having output terminals; a plurality of nonactive stages each having an input for receiving input signals from the

source, an output for supplying output signals to a load, and adjustable reactance elements intermediate the respective input and output of every stage, one of said reactance elements being a differential capacitor having two stator plate input terminals connected across the output terminals of the source, and a rotor plate output terminal operatively connected to the load; means for tuning at least one of the adjustable reactance elements of each stage so as to set every stage to be resonant at different frequencies of the frequency spectrum of the input signals; and means for adjusting at least one of the adjustable reactance elements of each stage independently from other adjustable reactance elements of every other stage so as to selectively vary the amplitude of at least a selected one of the respective frequencies of the spectrum for altering the level of attenuation at said selected one frequency, whereby the output signals supplied to the load have the desired attenuation versus frequency characteristic for the entire frequency spectrum.

4,032,867
BALANCED TRANSVERSAL FILTER

William E. Engeler, and Richard D. Baertsch, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,415
Int. Cl.² H03H 7/28; H03K 5/159; H01L 29/78, 27/10
U.S. Cl. 333—70 T 8 Claims



1. A transversal filter comprising

a substrate of semiconductor material including a first channel portion adjacent a major surface of said substrate and a second channel portion adjacent said major surface,

a group of electrodes insulatingly overlying each of said channel portions,

said group of electrodes forming with said substrate a portion of a first charge transfer shift register over said first channel portion and a portion of a second charge transfer shift register over said second channel portion,

each of said electrodes having a split over said first channel portion dividing each of said electrodes over said first channel portion into a first part and a second part, the portion of each of said electrodes overlying said second channel portion constituting a third part thereof,

a first conductive line connected to the first parts of said electrodes,

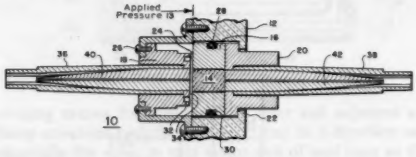
a second conductive line connected to the second parts of said electrodes,

the capacitance of the first parts of said electrodes being equal to the sum of the capacitances of the second and third parts of said electrodes.

4,032,868
MULTIMODAL HIGH PRESSURE WAVEGUIDE WINDOW

Ronald E. Trudeau, Goshen, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 5, 1976, Ser. No. 683,590
Int. Cl.² H01P 1/16, 1/08, 1/30, 5/08
U.S. Cl. 333—98 P 4 Claims



1. A multimodal microwave waveguide window for traversing a metal barrier comprising:

a hollow input taper section having a first and a second end portion, said first end portion having a rectangular cross-section and said second end portion having a circular cross-section.

a cylindrical silica window coupled to said second end portion;

a hollow output taper section having a first and a second end portion, said first end portion having a rectangular cross-section, said second end portion being contiguously disposed against said cylindrical window;

a first pair of "duck-billed" shaped tapers disposed in said input taper for precluding rotation of RF energy;

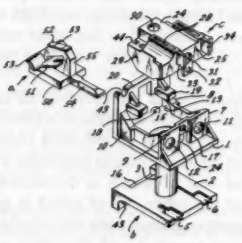
a second pair of "duck-billed" shaped tapers disposed in said hollow output taper section also for precluding rotation of RF energy;

a quarter wave transforming means disposed between said input taper and said waveguide window for matching impedance between said hollow input taper section and the cylindrical window.

4,032,869
RELAY WITH PIVOTING ARMATURE

Bernhard Dietrich, Eichenau, and Anton Happach, Munich, both of Germany, assignors to Schaltbau Gesellschaft m.b.H., Munich, Germany

Filed Feb. 24, 1976, Ser. No. 660,918
Claims priority, application Germany, Apr. 15, 1975, 2516535
Int. Cl.² H01H 67/02
U.S. Cl. 335—132 4 Claims



1. In a relay with pivoting armature and first and second contact means cooperating with the armature, a two part support structure comprising:

a coil carrier with a rectangular flange from which extends wall means with apertures for receiving the first set of contacts, the wall means having guide surfaces for support of pivot motion of the armature; and

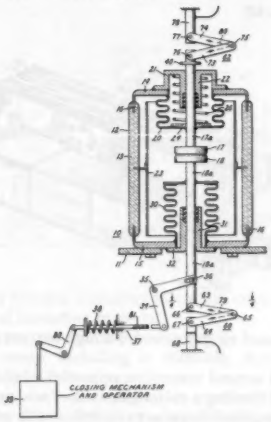
a head piece being fastened to said carrier adjacent said flange having apertures for receiving the second set of contacts, further having partition means extending towards said flange, the head piece having outside wall means with holders for magnets, which if placed in the holders provide for magnetic blowing.

4,032,870

ELECTRIC CIRCUIT BREAKER WITH ELECTROMAGNETIC-ASSIST MEANS FOR OPPOSING MAGNETIC CONTACT-SEPARATING FORCES

John A. Oppel, Aldan, and Virgel E. Phillips, Springfield, both of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Sept. 15, 1975, Ser. No. 613,656
Int. Cl.² H01H 3/42
U.S. Cl. 335—195 14 Claims



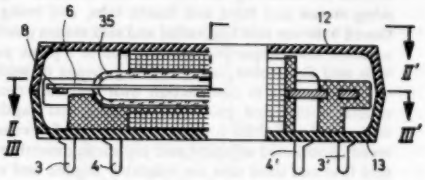
1. An electric circuit breaker comprising:
a. a first contact rod and a first contact fixed thereto,
b. a second contact rod and a second contact fixed thereto, said second contact being movable into engagement with said first contact to close said circuit breaker and movable out of engagement with said first contact to open the circuit breaker and interrupt the circuit therethrough, said second contact remaining in engagement with said first contact while said circuit breaker is in its fully closed position,
c. means for movably mounting said first contact for movement with said second contact: (i) following initial engagement of said contacts during the final portion of closing motion of said contact and (ii) during the initial portion of opening motion of said second contact,
d. first electromagnetic-assist means coupled through said first contact rod to said first contact for developing while said contacts are engaged a magnetic force on said first contact which varies directly in accordance with the current through said contacts and which urges said first contact toward said second contact,
e. second electromagnetic-assist means coupled through said second contact rod to said second contact for developing while said contacts are engaged a magnetic force on said second contact which varies directly in accordance with the current through said contacts and which urges said second contact toward said first contact,
f. and means for blocking motion of said first contact with said second contact after said initial opening motion of said second contact and for preventing during subsequent opening motion of said second contact the transmission of force from said first electromagnetic-assist means to said second contact.

4,032,871

CARRIER FOR CIRCUIT ELEMENTS HAVING CONTACT-MAKING TERMINALS

Hans Sauer, Deisenhofen, Germany, assignor to Hans Sauer, Deisenhofen, Germany and Matsushita Electric Works Ltd., Osaka, Japan, a part interest to each

Filed July 31, 1975, Ser. No. 600,805
Claims priority, application Germany, Feb. 17, 1975, 2506626
Int. Cl.² H01H 9/02
U.S. Cl. 335—202 14 Claims



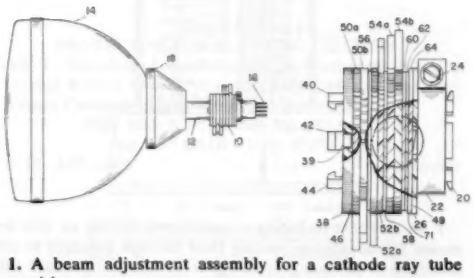
1. A carrier for circuit elements comprising:
a. a frame member of insulating material having terminals embedded therein;
b. said terminals having interior portions for connection to circuit elements within the carrier and exterior portions emerging from opposite sides of the frame member in a single plane;
c. two housing caps mounted on the frame member to enclose the frame member and circuit elements; and
d. said frame member having support surfaces provided on the frame member for the housing caps, the edges of the housing caps contacting said support surfaces and said edges and support surfaces constructed to fit into each other in a stepped manner.

4,032,872

BEAM ADJUSTMENT ASSEMBLY FOR A CATHODE RAY TUBE

Jerrold Kerwin Kratz, and Edward Walter Christensen, II, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 21, 1975, Ser. No. 624,634
Int. Cl.² H01F 7/00
U.S. Cl. 335—212 6 Claims



1. A beam adjustment assembly for a cathode ray tube comprising:
supporting means including a nonmagnetic supporting member having a central aperture for receiving the neck of said tube and a first resilient nonmagnetic collar having cam receiving means and first and second tabs and being in a plane substantially perpendicular to the axis of the neck of the tube; said supporting means further including captivating means for providing a surface substantially

parallel to said first collar and substantially a first distance therefrom;

clamping means positioned on said supporting member for enabling the prevention of movement of said supporting member relative to said tube;

means positioned adjacent said supporting member and between said first collar and said capativating means and having a central aperture therein for receiving the neck of said tube, for providing a plurality of magnetic pole regions adjacent said central aperture thereof to produce magnetic fields in said central aperture; and

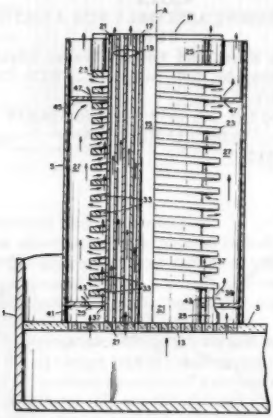
a second nonmagnetic collar having a central aperture therein for receiving the neck of said tube, having camming means and third and fourth tabs, and being positioned between said first collar and said means positioned adjacent said supporting member and in a plane parallel with said first collar, said camming means of said third collar operating in conjunction with said cam receiving means of said first collar for enabling said captivating means and said third collar to provide first forces on said means positioned adjacent said supporting member when said first and third tabs are rotatably aligned and second forces on said means positioned adjacent said supporting member when said second and fourth tabs are rotatably aligned, thereby providing for control of the degree of restraint of the movement of said means postioned adjacent said supporting member relative to said supporting member by alternately applying forces to said first and third tabs and to said second and fourth tabs.

4,032,873

FLOW DIRECTING MEANS FOR AIR-COOLED TRANSFORMERS

Philip A. Jallouk, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed May 21, 1976, Ser. No. 688,871
Int. Cl.² H01F 27/08
U.S. Cl. 336—57 **2 Claims**



1. In a system including a transformer having an axis and means for circulating cooling fluid through passages in said transformer extending in the general direction of said axis, said transformer including an inner winding, an outer winding having openings between turns, and an intermediate electrically non-conductive barrier all in nested relation about said axis, said barrier defining with said outer winding an annular axial passage of substantially constant width, an end of said passage constituting an entrance for a first annular stream of said cooling fluid, the improvement comprising:

an electrically non-conductive imperforate tube encompassing said winding to form therewith an axially extending annular chamber for conveying an axially flowing stream of said cooling fluid, said chamber having a width in the range of from 4 to 25 times the width of said axial passage, and

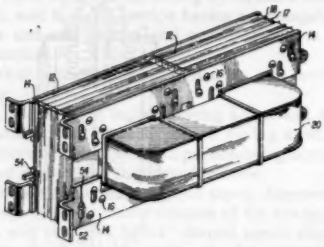
a baffle mounted within said chamber for defining with said outer winding an annular opening for cooling-fluid flow, said opening having a hydraulic diameter approximately equal to the hydraulic diameter of said passage.

4,032,874

REACTOR CORE

Henry W. Kudlacik, and Robert L. Winchester, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 26, 1975, Ser. No. 607,761
Int. Cl.² H01F 27/26
U.S. Cl. 336—60 **6 Claims**



1. A laminated air-gap core for a high current reactor comprising:

a. first and second respective oppositely disposed pairs of core legs forming a rectangle, each of said core legs being of a trapezoidal shape so as to define with adjacent legs a plurality of diagonal air gaps devoid of any solid spacers at respective corners of said rectangle;

b. a pair of end plates disposed along opposite sides of each of said first oppositely disposed pair of core legs and extending at right angles therefrom so as to partially extend along the sides of each of said second pair of oppositely disposed core legs and extending across the gaps defined by adjacent core legs and engaging the planar edges of said core legs in flat abutting frictional relationship;

c. each of said core legs comprising:

c_1. a plurality of very thin ferromagnetic laminations having said trapezoidal shape and being of a flat planar configuration both before assembly into said core and after assembly and compression therein;

c_2. a plurality of thick planar non-magnetic spacer members having substantially the same shape as said end plates interposed at regular intervals within said core engaging said laminations in flat abutting frictional relationship and separating said laminations of said core legs into a plurality of lamination groups, said spacer members operating to change the pattern of shear-resisting forces applied between said laminations during operation of said reactor so as to reduce the maximum shear-resisting forces between any lamination and any adjacent planar surface by a factor equal to the number of lamination groups created by the interpositioning of said spacer members;

d. means applying a substantially uniform compressive force to each of said first pair of oppositely disposed pair of core legs to apply to the laminations and spacer members thereof a compressive force sufficient to compress said laminations without deformation of the same, said compressive force being sufficient to apply frictional forces

between said laminations, said end plates and said spacer members to resist the maximum shear force caused by electrical phenomena during operation of said reactor aid tending to close or deform said air gaps;

e. means applying a substantially uniform compressive force to each of said second pair of oppositely disposed pair of core legs to apply thereto a compressive force sufficient to establish without deformation of said laminations an equivalent frictional force as is applied to each of said first oppositely disposed pair of core legs.

4,032,875

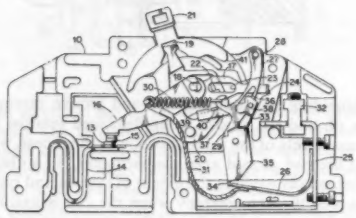
CIRCUIT BREAKER

Harold E. Beittary, Rio Piedras, P.R., assignor to Caribe Circuit Breaker Co., Inc., San Juan, P.R.

Filed May 27, 1976, Ser. No. 690,664

Int. Cl.² H01H 73/24

U.S. Cl. 337—70 **5 Claims**



1. A circuit breaker including in combination

a housing of insulating material;

a fixed contact mounted in said housing;

actuating means including a manually movable handle mounted in said housing;

a contact carrier with a movable contact thereon, said contact carrier pivotally engaging said actuating means at a pivot point;

a trip arm pivotally mounted in said housing;

a contact opening arm having one end pivotally mounted on said trip arm;

an overcenter spring connected between said contact carrier and said trip arm;

said actuating means, contact carrier, and overcenter spring forming an overcenter arrangement for closing said contacts when the spring is on one side of said pivot point and for opening said contacts when the spring is on the other side of said pivot point;

said pivot point being in a position with the spring on the one side thereof when said handle is placed in a first position, and being in a position with the spring on the other side thereof when said handle is placed in a second position while said trip arm is in a set position;

an overcurrent latch mechanism engaging said trip arm and maintaining said trip arm in the set position with said spring urging said trip arm toward a tripped position when said contacts are closed; and

a load terminal mounted in said housing;

said overcurrent latch mechanism including a current responsive member connected in circuit between the movable contact and the load terminal;

said overcurrent latch mechanism being operative to disengage said trip arm in response to a predetermined current condition in said current responsive member releasing said trip arm for movement to the tripped position;

movement of the trip arm to the tripped position moving the spring to the other side of said pivot point whereby said overcenter arrangement tends to cause said contacts to open;

said trip arm forcing the other end of said contact opening arm against the contact carrier during movement of the trip arm to the tripped position to cause opening of said contacts.

4,032,876

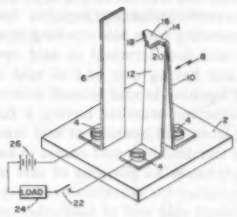
AMBIENT-COMPENSATED CIRCUIT BREAKER

Lyndon W. Burch, Boston, Mass., assignor to B/K Patent Development, Inc., Highland Park, Ill.

Filed Oct. 3, 1975, Ser. No. 619,218

Int. Cl.² H01H 71/16

U.S. Cl. 337—75 **20 Claims**



1. An electrical circuit breaker comprising:

a base;

a first metal strip member having first and second end portions and being mounted on the base by said first end portion, the second end portion including a first electrical contact part, and the second end portion with its electrical contact part being resiliently biased to move from a first latched position to a second unlatched position;

a second metal strip member mounted on the base and comprising at least one pair of divergent legs having their upper ends joined together and their lower ends spread apart to form a triangle on the base, said lower ends being fixed on the base to maintain the divergence of said legs; the upper end portion of at least one of said legs including a second electrical contact part, the second electrical contact part being adapted to latch with and be in electrical engagement with the first electrical contact part when in the first latched position;

said first and second contact parts being electrically open when the first member is in its second unlatched position;

means for moving said second end from its second unlatched position into said first latched position in which said contact parts are electrically engaged; and

means for making electrical circuit connections to the first end of the first member and to the lower end of said one of the divergent legs.

4,032,877

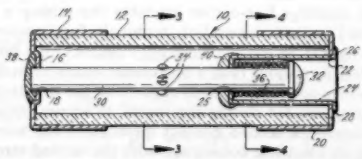
PROTECTOR FOR ELECTRIC CIRCUITS

Craig L. McAlister, deceased, late of Florissant, Mo. (by George Ruxton McAlister, executor), assignor to McGraw-Edison Company, Elgin, Ill.

Filed May 3, 1976, Ser. No. 682,649

Int. Cl.² H01H 71/20, 37/76

U.S. Cl. 337—148 **13 Claims**



1. A circuit-controlling device which can be incorporated into an electric circuit to open said electric circuit whenever the temperature of said circuit-controlling device reaches a

predetermined value and which comprises a housing, a first terminal adjacent one end of said housing, a second terminal adjacent the other end of said housing, and elongated recess in said first terminal, said first terminal having an opening in the inner end of said recess, said second terminal having an opening therein, an elongated current-conducting member which is disposed within said housing and which remains un-fused throughout the operation of said circuit-controlling device and throughout the opening of said electric circuit whenever the temperature of said circuit-controlling device reaches said predetermined value, said elongated current-conducting member having a portion thereof normally lodged within said opening at said inner end of said recess in said first terminal, said elongated current-conducting member having another portion thereof extending from said opening at said inner end of said recess in said first terminal to said opening in said second terminal and having one end of said other portion lodged within said opening in said second terminal, said elongated current-conducting member having a further portion thereof extending from said opening at said inner end of said recess in said first terminal into said recess in said first terminal, a spring which biases all portions of said elongated current-conducting member for movement relative to said housing and thereby biases said end of said other portion of said elongated current-conducting member for movement away from said opening in said second terminal to open said electric circuit and also biases said further portion of said elongated current-conducting member for movement outwardly of said recess in said first terminal and hence for movement from a normally-retracted position toward an extended position, a mass of heat softenable material which normally provides a mechanical connection, and normally helps provide an electrical bond, between said other portion of said elongated current-conducting member and said second terminal, and a second mass of heat softenable material which normally provides a mechanical connection, and normally helps provide an electrical bond, between the first said portion of said elongated current-conducting member and said first terminal, said masses of heat softenable material and said elongated current-conducting member holding said electric circuit closed as long as the temperature of said circuit-controlling device does not exceed said predetermined value, both of said masses of heat softenable material responding to a temperature above said predetermined value to soften and thereby permit said spring to move all portions of said elongated current-conducting member axially relative to said housing and thereby move said other portion of said elongated current-conductint member away from said second terminal to open said electric circuit and also to move said further portion of said elongated current-conducting member to said extended position.

4,032,878
CARTRIDGE FUSE CARRIER ASSEMBLY

Pierluigi Ranzanigo, Brescia, Italy, assignor to Bassani S.p.A., Milan, Italy

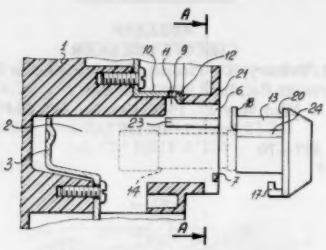
Continuation-in-part of Ser. No. 456,278, March 29, 1974, Pat. No. 3,936,787. This application Jan. 22, 1976, Ser. No. 651,394

Claims priority, application Italy, Feb. 6, 1975, 19996/75; May 30, 1973, 24840/73

Int. Cl.² H01H *85/14*

U.S. Cl. 337—228 **8 Claims**

1. A cartridge fuse carrier assembly comprising: a housing; first and second connection terminals for connecting the assembly into an electrical circuit; a recess in the housing for receiving a cartridge fuse; a first contact member in the recess and having an electrical connection with the first terminal; an insulating cap for closing the recess, to secure the cartridge fuse therein; a second contact member in the housing and having an electrical connection with the second terminal; an electrically conducting member carried by the cap for cooperating with a first end member of the cartridge fuse, to provide an electrical connection between the first end member of the cartridge fuse and the second contact member; and engagement means on the cap co-operable with the housing for securing the cap at the opening of the recess, by displacement of the cap carrying the cartridge fuse in the axial direction of the recess whereby a second end member of the fuse is brought into abutment against said first contact member, and then displacement of the cap in a second rectilinear direction transverse with respect to the axial direction of the recess to bring the engagement means into the cap-securing position, an internal surface of the recess and a surface of the cap which in the cap-secured position lies adjacent said surface of the



recess providing a co-operable rib and groove arrangement, with the rib and the groove being displaced relative to each other transversely of the axial direction of the recess, when the cap is at the end of said axial displacement, by a distance at least substantially equal to the extent of said second rectilinear movement of the cap whereby when the cap is axially introduced into the recess the rib and the groove are not engaged with each other but when said second rectilinear movement is effected the rib and the groove engage into each other with a snap action.

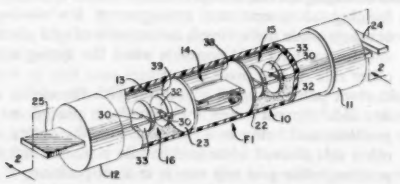
4,032,879
CIRCUIT-PROTECTING FUSE HAVING ARC-EXTINGUISHING MEANS

Elmer J. Monagan, Jamestown, N.Y., assignor to Teledyne, Inc., Los Angeles, Calif.

Filed Nov. 18, 1975, Ser. No. 632,951

Int. Cl.² H01H *85/38*

U.S. Cl. 337—278 **19 Claims**



1. A circuit-protecting fuse, comprising: an insulating housing having a longitudinal axis and having electrically conductive connector means on opposite ends thereof to connect the fuse in an electrical circuit; at least one short circuit section in said housing, connected in electrically conductive relationship at opposite ends thereof with the connector means, said short circuit section having at least one area defining a heat-generating fusible link; a non-conducting arc blocking member of a material which produces a deionizing gas when heated to a predetermined temperature positioned at said fusible link in close proximity thereto and covering substantially only the fusible link to block laterally of the longitudinal axis of the housing any arc which tends to form under an overload condition of predetermined magnitude in a circuit in which said fuse is connected, whereby the fusible link melts and vaporizes, and the heat thus produced causes the arc blocking member to generate an amount of deionizing gas to extinguish any arc

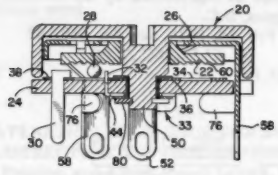
which forms at the vaporized section; and closure means sealed on the ends of the housing to contain the deionizing gas whereby any arc which forms is quickly extinguished.

4,032,880

ELECTRICAL DEVICE

Aldo Di Michele, Chicago; John D. Gallas, Roselle, and Frank W. Grimm, Chicago, all of Ill., assignors to Drestech Corporation, Chicago, Ill.

Filed Mar. 8, 1976, Ser. No. 664,707
Int. Cl.² H01C *10/28*
U.S. Cl. 338—157 12 Claims



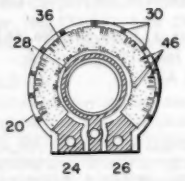
1. In an electrical device including at least one first terminal, at least one second terminal, a movable contact, and spaced-apart conductors connected to the respective terminals, said movable contact bridging the opposed conductors to complete a circuit between the first and second terminals, said movable contact comprising a conductive ball engaging the surface of one of said conductors; and said other conductor being mounted for rotation relative to said one conductor, the improvement wherein the surface of said one conductor is substantially smooth, said other conductor comprising a drive means for said ball, a grooved path defined by said other conductor, said path extending around the axis of rotation of the other conductor and deviating radially relative to said axis, said ball being held on said grooved path, and means for rotating said other conductor whereby said ball rolls on said surface in response to movement of the other conductor, the path of movement over said surface being controlled by said grooved path.

4,032,881

RESISTANCE ELEMENT WITH IMPROVED LINEARITY AND METHOD OF MAKING THE SAME

Delbert Lowell Singleton, Riverside, Calif., assignor to Bourns, Inc., Riverside, Calif.

Filed Feb. 6, 1976, Ser. No. 656,039
Int. Cl.² H01C *10/00*
U.S. Cl. 338—195 10 Claims



1. In a potentiometer having an insulative substrate, a resistance element deposited thereon, a collector, a wiper means electrically connecting said element and collector, and termination means associated respectively with said element and collector, wherein the improvement comprises:

resistance adjusting means for trimming said resistance element including a plurality of spaced conductive pads fixedly distributed along said substrate in intimate electrical contact with said resistance element, each of said pads presenting a contact area for a trimming probe, and

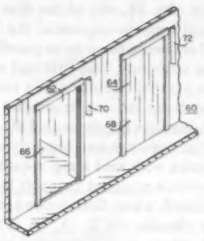
said resistance element being trimmed to predetermined resistance values between each of said pads.

4,032,882

ELEVATOR SYSTEM

Alan F. Mandel, Pittsburgh, Pa.; Louis M. Capuano, Westfield; Theodore E. Frask, Wayne, both of N.J., and Denis E. Bedel, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 17, 1976, Ser. No. 658,931
Int. Cl.² G08B *5/36*
U.S. Cl. 340—19 R 19 Claims



1. An elevator system, comprising: a building having a plurality of floors,

an elevator car mounted for movement in said building to serve the floors,

control means for selecting the service direction in which said elevator car will proceed from a floor it is serving,

and display means having an array of electrically energizable elements,

said display means including pattern selection means responsive to said control means,

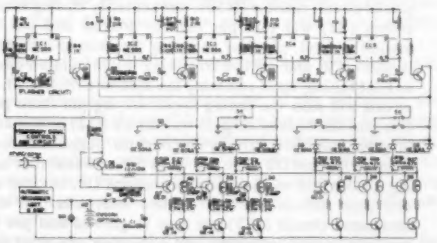
said pattern selection means selectively energizing said elements while said elevator car is serving a floor to provide a predetermined sequence of at least three different patterns which visually indicate the selected service direction.

4,032,883

PORTABLE TRAFFIC SIGNAL

Preston H. Gibson, 129 Anarece Ave., Auburndale, Fla. 33823

Continuation-in-part of Ser. No. 483,770, June 27, 1974, and a continuation-in-part of Ser. No. 582,935, June 2, 1975. This application Dec. 5, 1975, Ser. No. 637,882
Int. Cl.² B60Q *1/00*; G08G *1/00*
U.S. Cl. 340—41 A 1 Claim



1. A portable traffic signal comprising:

a. a cabinet having a box-like configuration with a top portion (34), an oblong vertical lamp means assembly

(24) in said cabinet, said lamp means assembly (24) including a base (25) and a telescoping support (28), a cover (30) and a handle (32) so that the assembly (24) may be extended and retracted, said cover when retracted assuming a position substantially co-planer with said top portion (34);

b. a pair of red, amber and green signal lamp means (36, 38, 40) with double lens before each lamp means disposed in said lamp assembly, one pair over the other and so disposed that each lamp means of one pair directs light signals in a direction which is substantially at right angles to the other signals emitted by the other lamp means, one lamp means of each pair of the red, amber and green lamp means constituting a first set, the other lamp means of each pair of red, amber and green lamp means constituting a second set;

c. a lamp circuit including first and second wires, the three lamp means (36, 38, 40) of the first set being in parallel between said wires in sequence, the three lamp means of the second set being likewise in parallel between said wire in the same sequence, said first and second sets therefore forming six parallel circuits, a bias resistor in each parallel circuit and lamp driving transistor means (Q13, Q14, Q15) with diodes (D1 through D8) in each parallel circuit said bias resistors and lamp driving transistor means being in series with said lamp means;

d. a timing circuit coupled to each lamp means including third and fourth wires, first, second, third, fourth and fifth integrated circuits, (IC2, -3, -4, -5) between said third and fourth wires, each integrated circuit being a six-pin timing module including an output pin, a timing RC circuit in parallel with and coupled to each of said integrated circuits, said first integrated circuit being a flasher circuit, first, second, third, fourth and fifth gate transistor means, one being coupled to each integrated circuit output pin and a plurality of said lamp driver transistors via first through eight diodes (D1 through D8); and,

e. DC lead lines for connecting powe across said first, second, third and fourth wires, a first on-off switch in said lead lines, a switching transistor (Q6) and a first power circuit resistor (R1) to said third and fourth wires and a second power circuit resistor (R50) to said first and second wires, a second switch in said timing circuit which is normally opened but will start the timing cycle when momentarily closed, third through sixth switches (S3 through S6) one being connected to each of said second, third, fourth and fifth transistor gate means (Q2 through Q5), whereby,

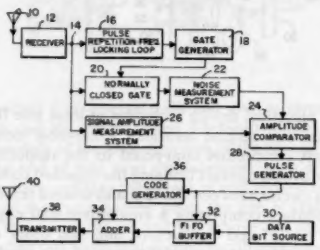
f. when the on/off switch is closed, DC power is applied to the circuit via the switching transistor and the power circuit resistors (Q1, R1 and R50) with the fourth and sixth switches open, the first integrated circuit (IC1) is lifted above ground leaving the output pin thereof positive into the gate of its gate transistor (Q1), acting as an inverter/amplifier, the collector goes negative into the base of the switching transistor (Q6) acting as an inverter/switch driving the collector positive, turning on the power to the lamp drivers and lamp means through the power circuit resistor (R50), momentarily closing second switch (S2) will pull pin four to ground and pin two toward ground, pin four resetting the second integrated circuit (IC2) and pin two triggering this integrated circuit to start timing, upon releasing the second switch (S2), the circuit will start the timing cycle, driving pin three positive into the base of its gate transistors (Q2) acting as an inverter amplifier, driving its collector negative through diodes (D1 and D2) into the lamp driver transistors turning on the first and second lamp means (I1, I2), the second gate collector going negative and pulls that third integrated circuit (IC3) pin four to ground and pin two towards ground, resetting and triggering the third integrated circuit (IC3), as long as the second gate transistor (Q2) collector and pin 4 remain at ground potential, third integrated circuit (IC3) is off and not timing, but, as soon as the timing cycle of the second integrated circuit is ended, pin 3 goes negative and second gate transistor (Q2) goes positive, the third integrated circuit (IC3) starts timing, pin 3 goes positive, the next transistor (Q4) collector goes negative through diodes (D3, D4), first lamp means (I1) goes off and third lamp means (I3) comes on but second lamp means (I2) remains on via a fourth diode (D4) being connected to the anode of second diode (D2), said on/off timing cycles carrying on until switched off.

4,032,884

ADAPTIVE TRUNK DATA TRANSMISSION SYSTEM

Frank S. Gutleber, Little Silver, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 24, 1976, Ser. No. 660,967
Int. Cl.² G08C *25/00*
U.S. Cl. 340—146.1 E **7 Claims**



1. In a data transmission system employing a tropospheric scatter communications link as a communications medium, apparatus comprising:

first means for measuring a propagation characteristic of said communications link to determine the error rate thereof; and

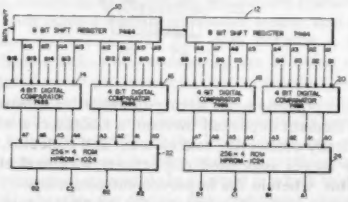
second means continuously operative in connection with said first means to interrupt transmission of data in real time via said tropospheric scatter link when said measured propagation characteristic is indicative of an error rate of said link in excess of a predetermined value, said second means including means for delaying the transmission of the interrupted data to be transmitted until said measured propagation characteristic is indicative of an error rate not in excess of said predetermined value.

4,032,885

DIGITAL CORRELATOR

Albert Roth, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 1, 1976, Ser. No. 662,794
Int. Cl.² H03K *5/18*
U.S. Cl. 340—146.1 AX **9 Claims**



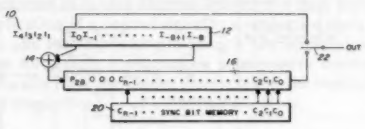
1. A digital correlator comprising:

a. shift register means for receiving input data words,
b. digital comparator means having first inputs connected to the outputs of said shift register and second inputs for receiving an input reference word for comparing the pattern of bits of said data words with the pattern of bits of said reference word and providing 0 outputs for bits that match and ones for bits that are mismatched,
c. first read only memory means coupled to the output of said digital comparison means for generating a coded binary number equal to the number of ones outputted from said comparison means,
d. second read only memory means connected to the output of said first read only memory means and having a plurality of output signals representing the number of errors detected in the comparison of said data word with said reference word.

4,032,886
CONCATENATION TECHNIQUE FOR BURST-ERROR CORRECTION AND SYNCHRONIZATION

John En, Palatine, and Albert Joseph Leitich, Chicago, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 1, 1975, Ser. No. 636,472
Int. Cl.[2] G06F 11/12
U.S. Cl. 340—146.1 AQ 12 Claims



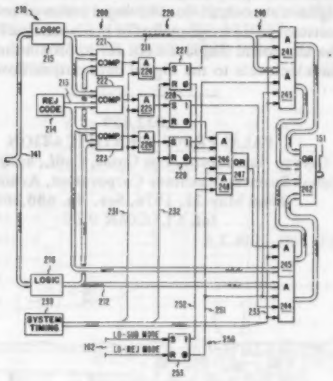
1. In a digital communication system, an encoder comprising:
means for encoding an information bit stream and producing a data bit stream, said data bit stream comprising a predetermined number of reference level bits, said data bit stream further comprising a predetermined number *n* of sync bits; said encoder further comprising concatenation means for replacing *n* of said reference level bits with said sync bits.

4,032,887
PATTERN-RECOGNITION SYSTEMS HAVING SELECTIVELY ALTERABLE REJECT/SUBSTITUTION CHARACTERISTICS

David C. Roberts, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 374,612, June 28, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,377
Int. Cl.[2] G06K 9/00
U.S. Cl. 340—146.3 ED 8 Claims

1. In a pattern-recognition system having a detector for converting an input pattern into electrical signals, means for selectively altering the reject/substitution characteristics of said system, comprising:
a plurality of recognition means having inputs coupled in parallel to said detector for producing a plurality of mutually independent recognition codes each representing an identity of said input pattern;
comparison means coupled to said recognition means, for producing comparison signals indicative of the relationship of said recognition codes to each other and to a reject code;
control means for receiving a plurality of reject/substitution mode signals; and
output gating means coupled to both said comparison means and to said control means, for selecting among one

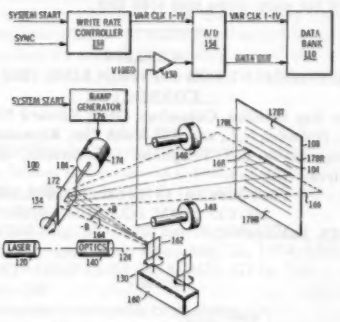


of said recognition codes and said reject code in response both to said comparison signals and to said mode signals.

4,032,888
NONLINEAR SCAN DRIVE READER WITH VARIABLE CLOCK CORRECTION

Douglas Wright Broyles, San Jose, and Troy Cecil Stark, Campbell, both of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,362
Int. Cl.[2] G06K 9/00
U.S. Cl. 340—146.3 F 15 Claims



1. A scanner for reading record data from a record medium by scanning the record medium with an energy beam to provide a digital data output flow with a nonlinear bit density, comprising:
a mechanical oscillator means having a sinusoidal displacement characteristic;
energy-directing means responsive to the sinusoidal displacement of the oscillator means for causing the energy beam to scan in a predetermined pattern across the record medium causing the energy of the beam to become modulated by the record data at a modulation density directly proportional to the scanning velocity of the energy beam;
energy sensor means for detecting the modulated energy for providing a correspondingly modulated analog signal;
analog to digital means responsive to the modulated analog signal for providing a correspondingly modulated digital data output flow having a flow rate directly proportional

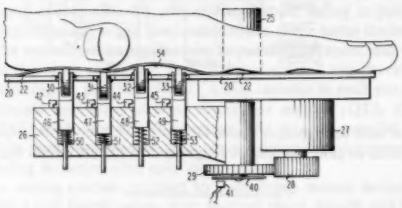
to the relative scan motion between the energy beam and the record medium; and

controller for providing a variable clock to accompany the digital data output flow having a series of predetermined constant pulse frequencies for predetermined segments of the sinusoidal displacement for approximately matching the clock rate to the digital data output flow rate.

4,032,889
PALM PRINT IDENTIFICATION

Ernie George Nassimbene, Los Gatos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 21, 1976, Ser. No. 688,802
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 E **11 Claims**



1. Apparatus for characterizing an individual based upon the spacing of at least two preselected lines on a human palm, comprising

scanning probe means translatable with respect to a scan line and in contact with a surface of said palm;

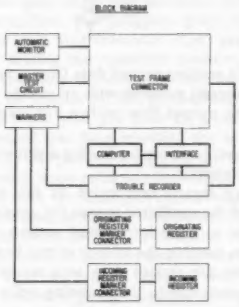
said scanning probe means including transducer means for generating output signals representative of the pattern of skin lines along said scan line; and

transducer means responsive to the movement of said scanning probe means normal to said scan line for generating output signals representative of the gross surface profile of the palm along said scan line.

4,932,890
ARRANGEMENT FOR CONTROLLING SEIZURE OF A CONNECTOR

Lester Ray Gilfillen, Columbus, Ohio; Edward Nicholas Shipley, Holmdel, N.J., and Ray Keith Zies, Reynoldsburg, Ohio, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 16, 1976, Ser. No. 696,748
Int. Cl.² H04M *3/22*; H04Q *9/00*
U.S. Cl. 340—147 C **17 Claims**



1. An arrangement for controlling seizure of a connector, wherein a connector seizure circuit is provided for recognizing an attempt to effect normal seizure of the connector, and wherein the seizure circuit is responsive to a recognized normal seizure attempt to permit normal seizure, the arrangement comprising:

A. means independent of the seizure circuit for registering an attempt to effect special seizure of the connector;

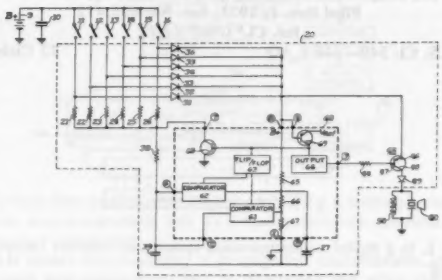
B. special means rendered effective by the registering means, while a special seizure attempt is registered therein, for detecting a normal seizure attempt while preventing recognition thereof by the seizure circuit;

C. and, means controlled by the effective special means, incident to detection of a normal seizure attempt, to remove the registration from the registering means so as to allow normal seizure attempt recognition by the seizure circuit.

4,032,891
SIGNAL TRANSMITTER USING AN ACTIVE THICK FILM SUBSTRATE

Robert R. Podowski, Elmhurst, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Division of Ser. No. 592,582, July 2, 1975. This application Sept. 2, 1976, Ser. No. 719,761
Int. Cl.² G08B *3/00*
U.S. Cl. 340—148 **3 Claims**



1. An active thick circuit having connection terminals and adapted for use in a portable transmitter for producing a plurality of output signals of different frequency in response to closure of a corresponding plurality of external switches comprising:

a nonconductive substrate;

integrated circuit pulse means on said substrate;

a plurality of resistors deposited on said substrate and connected between said terminals and said pulse means;

a plurality of diodes on said substrate and connected between said terminals and said pulse means; and

a timing circuit including a capacitor cooperating with said resistors for adjusting the pulse rate of said pulse means in accordance with the operation of said external switches.

4,032,892
SEMICONDUCTOR SPEECH CHANNEL SWITCH

Mitsuo Matsuyama, Yokohama, and Shinzi Okuhara, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Japan

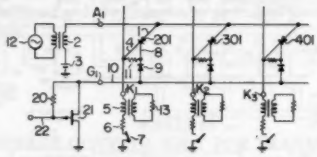
Filed Dec. 22, 1975, Ser. No. 642,719
Claims priority, application Japan, Dec. 27, 1974, 49-148619
Int. Cl.² H04Q *3/50*
U.S. Cl. 340—166 R **10 Claims**

1. In a semiconductor speech path switch arrangement for selectively connecting a transmitting circuit, which is connected to a prescribed row line of a matrix made up of *m* rows and *n* columns of signal transmission lines where *m* is an integer and *n* is an integer greater than 1, to a receiving circuit connected with one of the column lines of signal transmission lines, said arrangement including

an *mxn* matrix of PNPN switching elements, each element having an anode connected to a respective row line, a

cathode connected to a respective column line, and a control gate for receiving a control signal to render said element conductive to interconnect the row line and the column line to which said element is connected and thereby provide a signal transmission path from a transmitting circuit through said matrix to a receiving circuit, and

a number *m* of control gate lines respectively connected through diodes to the control gate of the *m* rows of said PNPN switching elements, by way of which said control signal is applied to control gate of the PNPN switching elements;



the improvement comprising

switching means, connected to each respective control gate line and having respective input terminals to which control signals are applied, for coupling a respective control signal to a respective control gate line to thereby render a selected switching element conductive only during the application of a control signal to a respective input terminal, and for otherwise providing a low impedance shunt path for signals appearing on a respective control gate line away from the diodes connected to the control gates of a respective row of switching elements.

4,032,893

RECONFIGURABLE DATA BUS

Donald Martin Moran, Burnsville, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 23, 1976, Ser. No. 651,770
Int. Cl.² H04J *3/14*; H04Q *9/00*
U.S. Cl. 340—166 R **8 Claims**

1. A reconfigurable data bus transmission system for electrically reconfiguring the data bus structure established by the physical interconnections of a network of physically fixed digital data buses interconnecting a plurality of digital nodal communication devices, comprising in combination:

A. a plurality of digital data buses;

B. a plurality of digital nodal communication devices adapted to be coupled to selected ones of said digital data buses;

C. a plurality of digital reconfigurable data bus modules, one for each of said plurality of digital nodal communication devices, adapted to be connected intermediate to said digital data buses and said digital nodal communication devices, each of said digital reconfigurable data bus modules including:

a. at least one set of bus communication ports capable of receiving and transmitting digital information to and from said digital data buses,

b. a set of device communication ports capable of digital data communication to and from said digital nodal communication device, and

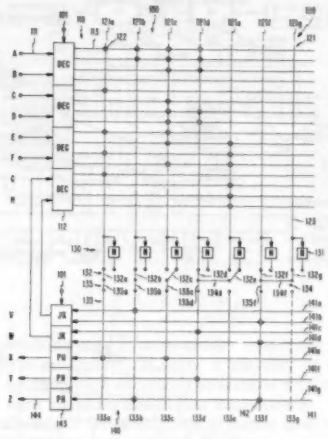
c. a switching means capable of the simultaneous and independent establishment of a plurality of connections, each of said connections consisting of the switching of data between at least one of said set of bus communication ports and said set of device communication ports.

4,032,894

LOGIC ARRAY WITH ENHANCED FLEXIBILITY

Robert Russell Williams, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 1, 1976, Ser. No. 691,807
Int. Cl.² H03K *19/08*; H04Q *9/00*
U.S. Cl. 340—166 R **6 Claims**



1. In a programmable logic array chip including a search array for providing a set of search signals on respective ones of a plurality of output columns, said output columns being selectively connectable to a plurality of input rows, and

a read array for providing a set of output signals on a plurality of output rows, said output rows being selectively connectable to a plurality of input columns,

the improvement comprising:

a complement array having means for providing both true and complement forms of each of said search signals, and having means for selectively coupling one of said forms of each of said search signals to said input columns.

4,032,895

ELECTRONIC DATA PROCESSING COMPUTER

Lucio Lanza, Milan, and Francesco Giovanni Vecchio, Catania, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Aug. 14, 1975, Ser. No. 604,575
Claims priority, application Italy, Aug. 21, 1974, 69573/74
Int. Cl.² G06F *13/00*, *9/16*, *9/20*; G11C *7/00*
U.S. Cl. 364—200 **19 Claims**

1. In an electronic computer comprising:

a first memory for recording instructions and data to be processed;

a second memory having microinstructions recorded therein;

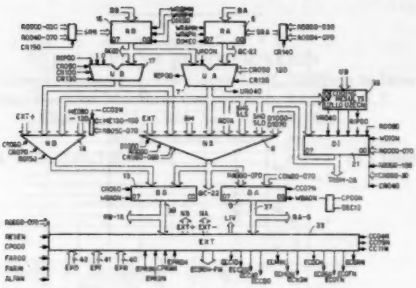
first addressing means receptive of an instruction from said first memory for addressing said second memory to provide a succession of microinstructions associated with the received instruction;

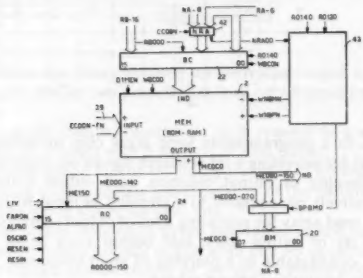
a third memory having a plurality of bit words stored therein, each word including a first and a second group of signals;

second addressing means receptive of a microinstruction from said second memory for addressing said third memory to provide at least one word associated with the received microinstruction;

processing means receptive of data from said first memory for processing same and including operation control means controlled by the signals of the first group for performing logic and arithmetic operations on said data

according to the signals of said first group and a plurality of registers having means controlled by the signals of the second group for effecting the selective connection of each to the input and to the output of said operation control means and to said first memory for reading micro-instructions stored therein and to said second memory for





reading instructions and data and for storing the results of said operations; and

means controlled by the signals of the second group including timing means for transmitting in succession said second group of signals to said registers for timing the transfer of data and operation results between said operation control means, said registers and said memories.

4,032,896

MICROPROCESSOR HAVING INDEX REGISTER COUPLED TO SERIAL-COUPLED ADDRESS BUS SECTIONS AND TO DATA BUS

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Anthony E. Kouvoussis, Phoenix, all of Ariz.; Rodney H. Orgill; Charles Peddle, both of Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

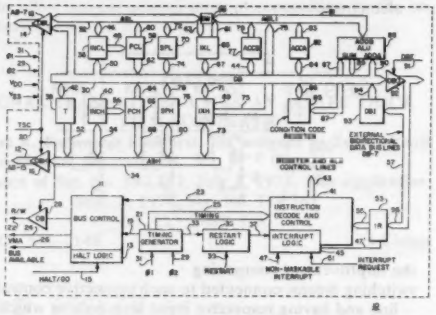
Division of Ser. No. 519,150, Oct. 30, 1974. This application Sept. 17, 1975, Ser. No. 614,032

Int. Cl.[2] G06F *9/20*

U.S. Cl. 364—200 **1 Claim**

1. A method of operating a processor comprising the steps of:

1. storing first information representative of a first address in a first register and transmitting said first information to a first bus to effect addressing a first memory location represented by said first address, said first bus being an address bus;
2. transmitting said first information representative of said first address by means of said first bus to an arithmetic means and temporarily retaining said first information in said arithmetic means;
3. modifying said retained first information by means of said arithmetic means during said addressing of said first location to obtain second information representative of a second address;
4. reading information from or writing information into said first memory location by means of a data bus, depending on whether a read operation or a write operation is to be executed;
5. transmitting said second information to said first register;
6. transmitting said second information to said first bus from said first register to effect addressing a second memory location represented by said second information;



7. transmitting said first information from said first bus to a second bus by means of switching means coupling said first and second buses during said addressing of said first location; and
8. performing an arithmetic operation on said first information on said second bus and third information present on said data bus prior to said transmitting of said second information to said first bus.

4,032,897

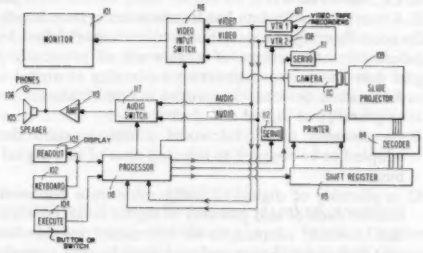
INTERACTIVE AUDIOVISUAL DISPLAY SYSTEM

Charles K. Pooley, Van Nuys, Calif., assignor to National Board of Medical Examiners, Philadelphia, Pa.

Filed Nov. 18, 1975, Ser. No. 632,976

Int. Cl.[2] G06F *1/00;* **G11B** *15/18*

U.S. Cl. 364—900 **21 Claims**



1. An interactive audiovisual display system comprising:

videotape means for storing a plurality of video segments, randomly accessible for display, each segment being identified with a code corresponding to the position of the segment on a tape relative to a predetermined datum position on said tape;

means for displaying to the user a plurality of options corresponding respectively to select ones of said segments;

user selection means for designating a preferred option from said plurality of options presently displayed;

a source of coded control signals, said singals including frames of data associated respectively with the options presented the user by said means for displaying, each

frame including the identification of the location of a select segment to be next executed at said videotape means in response to user selection of the option associated with said each frame; and

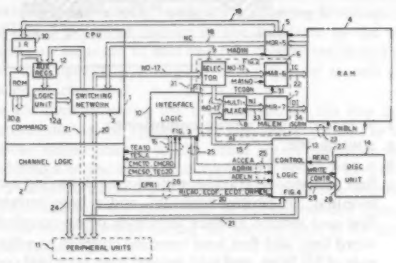
control means responsive to said user selection means and to said source of coded signals, said control means being responsive to the location identification from the frame associated with the preferred option, for controlling said videotape means to advance the tape from its present location to said location identification, said control means including means for monitoring the instantaneous speed and location of the tape while advancing, and means for varying the acceleration rate of the tape in response to the relative magnitudes of the instantaneous tape speed and the distance to go to said location identification.

4,032,898

INTERFACE CONTROL UNIT FOR TRANSFERRING SETS OF CHARACTERS BETWEEN A PERIPHERAL UNIT AND A COMPUTER MEMORY

Giorgio Grigoletti, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Dec. 10, 1975, Ser. No. 639,402
Claims priority, application Italy, Mar. 6, 1975, 67565/75
Int. Cl.² G06F *3/00*
U.S. Cl. 364—200 5 Claims



1. An electronic computer comprising:

a working memory for recording instructions and data;

a central processing unit for executing the instructions recorded in said memory, said instructions comprising input/output instructions;

a peripheral unit for writing and reading information on a recording carrier; and

a peripheral interface comprising:

a control unit actuated by control signals generated by said processing unit by decoding said input/output instructions for controlling the transfer of sets of information characters of predefined length between said working memory and said peripheral unit, said control unit including a control circuit for generating a first command signal when a set of characters is ready to be transferred;

a first channel for connecting said peripheral unit to said working memory by way of a connecting network including said central processing unit;

a second channel for connecting said peripheral unit directly to said working memory;

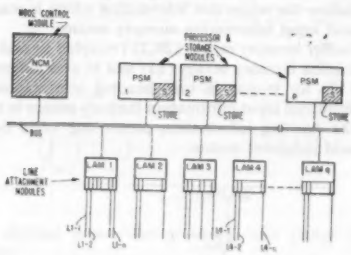
and switching means controlled by said control unit for transferring the first character of said sets over said first channel to the working memory and the remaining characters of the set over said second channel to said working memory, said switching means including means for connecting said first channel normally to said working memory and to actuate the connection of said second channel to said working memory.

4,032,899

APPARATUS AND METHOD FOR SWITCHING OF DATA

Christian Jakob Jenny, Thalwil, and Karl Albert Kuemmerle, Siebnen, both of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,473
Claims priority, application Switzerland, May 5, 1975, 5781/75
Int. Cl.² G06F *15/16*
U.S. Cl. 364—200 12 Claims



1. For switching data in store-and-forward mode, between any two of a multiplicity of ports, a plurality of switching processor modules each variously connectible with any of said ports and each characterized in that it comprises:

means allocatable for storing data in packet units subject to variably delayed forward retransmission;

means for allocating said storing means in response to requests for allocation;

means for designating packet storage allocations of said storing means and forward scheduling assignments of said modules relative to said ports, and routing information;

input transfer means for transferring data from any port, relative to which the respective module has been assigned packet storage responsibility, to a location in the respective storing means designated by said designating means;

means for developing and exchanging supervisory information with other said modules relative to: a) the status of packet storage in the storing means of the respective and other modules; and b) the status of availability, for forward transfers, of certain of said ports for which the respective module has exclusive assignment for forward scheduling and of others of said multiplicity of ports for which the other modules have exclusive assignments for forward scheduling; and

output transfer means for forward transferring each data packet stored in the respective storing means to a said port designated by said routing information designated by said designating means when the designated port is indicated to be available by availability status information provided by operation of said developing and exchanging means.

4,032,900

APPARATUS FOR DISTINGUISHING HEADING INFORMATION FROM OTHER INFORMATION IN AN INFORMATION PROCESSING SYSTEM

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1975, Ser. No. 629,563
Claims priority, application Japan, Nov. 15, 1974, 49-131645
Int. Cl.² G06F *3/00, 7/10*
U.S. Cl. 364—200 3 Claims

1. Apparatus for controlling information transmitted to a processing device, comprising:

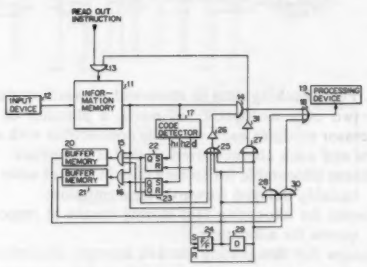
a. means (12) for inputting information, said information comprising in series arrangement a heading information positioning code, a heading information inserted immedi-

ately after said heading information positioning code, a body information, and a body information positioning code inserted immediately after said body information, said body information being formed of one or more detail information group each of which includes a plurality of item information;

b. input information memory means 11 for storing the information from said inputting means (12);

c. judgment means (17) coupled to said input information memory means (11) for distinguishing between the heading information and detail information groups, said judgment means (17) detecting that positioning code inserted before the respective information which is read out from said input information memory means;

d. buffer memory means (20,21) coupled to said iput information memory means (11) and to said judgment means (17) for storing in turn heading information read out from said input information memory means in response to the heading information positioning code detected by said judgment means;



e. means (22,23,25,26,14) coupled at least to said information memory means (11) and to said buffer memory means (20,21) for prohibiting the heading information from being transmitted to a processing device while said heading information is being read out from said input information memory means;

f. means (24,29,28,30) coupled to said judgment means (17) for temporarily inhibiting the detail information from being transmitted when said detail information positioning code is detected by said judgment means and for enabling the reading out of the heading information from said buffer memory means for transmission to said processing device; and

g. means (24,29,27,31,25,26,14) coupled to said judgment means (17) for reading out the detail information from said input information memory means when the handling information is read out from said buffer memory means, to form at least one unit record information comprised of a detail information group preceded by the heading information.

4,032,901

SYSTEM FOR STORING AND RETRIEVING INFORMATION AT THE MOLECULAR LEVEL

Cyrus Levinthal, 435 Riverside Drive, New York, N.Y. 10025

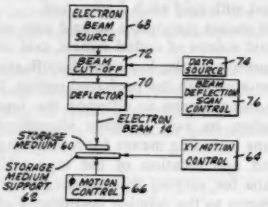
Continuation-in-part of Ser. No. 549,450, Feb. 12, 1975. This application June 4, 1975, Ser. No. 583,554

Int. Cl.² G11C *13/00, 13/02*

U.S. Cl. 340—173 NC **11 Claims**

1. An information storage medium comprising:

a substantially continuous layer of particles comprising an array of bit storage units, each bit storage unit being less than a few thousand Angstroms in size and each pair of adjacent bit storage units being spaced from each other by no more than up to a few thousand Angstroms, each unit comprising several particles of a material modifiable when irradiated by a focused electron beam without thereby modifying bit storage units adjacent thereto, and each bit storage unit storing one bit of information; and



means for supporting the layer of particles and the bit storage units thereof.

4,032,902

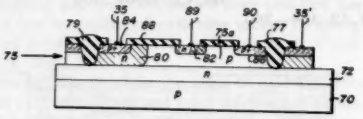
SEMICONDUCTOR MEMORY CELL CIRCUIT AND STRUCTURE

William H. Herndon, Sunnyvale, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Oct. 30, 1975, Ser. No. 627,444

Int. Cl.² G11C *11/44*

U.S. Cl. 340—173 FF **9 Claims**



1. A memory cell circuit comprising:

a. a word line;

b. a pair of bit lines;

c. first and second transistor means, each having a collector terminal, an emitter terminal, and a base terminal, said first and second emitter terminals being coupled to said word line, said first base terminal coupled to a first of said pair of bit lines, and said second base terminal coupled to the other of said pair of bit lines; and

d. a bistable circuit means including third and fourth transistor means, each having a collector terminal, an emitter terminal, and a base terminal, said third base terminal being coupled to both said first and fourth collector terminals, said third emitter terminal coupled to both said first base terminal and said first of said pair of bit lines, said fourth base terminal being coupled to both said second collector terminal and said third collector terminal, and said fourth emitter terminal being couple to said second base terminal and said other of said pair of bit lines, whereby said bistable circuit means assumes one stable state upon the application of a voltage on one bit line, and assumes another stable state upon the application of a voltage on the other bit line.

4,032,903

CHARGE INJECTION DEVICE ARRAYS

Paul Kessler Weimer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 13, 1976, Ser. No. 657,888

Int. Cl.² G11C *11/40*

U.S. Cl. 340—173 R **7 Claims**

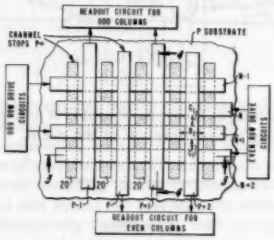
1. The combination of:

an array of charge injection devices arranged in columns and rows, each device comprising a portion of a row conductor insulated from and electrically coupled to a semiconductor substrate, and a portion of a column conductor which crosses and thereby overlaps the edges of

the row conductor and which is insulated from both the row conductor an substrate but which is electrically coupled to the substrate in the region thereof adjacent to the column conductor;

means for applying an operating voltage to one set of alternate row conductors of said array, of a polarity to cause potential wells to form in the substrate, each such alternate row conductor receiving said operating voltage for a period sufficient to cause the collection of photo-induced charge carriers for a period approximately equal to the duration of one field of an interlaced frame;

means for applying a voltage for creating a potential barrier in the substrate, to the row conductors on each side of any row conductor receiving an operating voltage, during



the time that operating voltage is being applied to that row conductor, and in the case of an end row conductor receiving an operating voltage, for applying a voltage for creating a potential barrier in the substrate to the row conductor adjacent to said end row conductor during the time that operating voltage is being applied to said end row conductor; and

means for then reversing the roles played by the row conductors, that is, by applying an operating voltage in the manner stated above, to the other set of alternate row conductors of the array, and applying a voltage for creating a potential barrier to the one set of alternate conductors for causing the collection of photo-induced charge carriers to be scanned during the second field of an interlaced frame.

4,032,904

MEANS FOR REFRESHING AC STABLE STORAGE CELLS

Kevin Lee Anderson, Winooski, and Luis Maria Arzubi, Colchester, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 9, 1975, Ser. No. 594,382

Int. Cl.² G11C *7/00*

U.S. Cl. 340—173 DR **4 Claims**

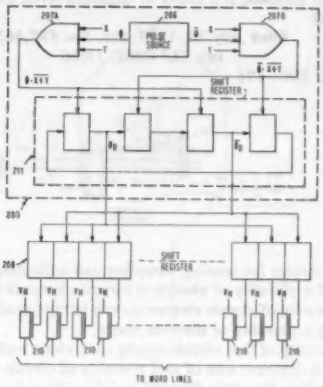
1. An electronic data storage array including a plurality of storage cells which require periodic refreshing, means for generating phase pulses, and primary shifting means responsive to said phase pulses for circulating a 1 level signal at a shift rate determined by the frequency of said pulses; wherein said means for generating phase pulse comprises:

a pulse generator for generating a train of pulses that is asynchronous with the cycle time of the storage array;

pulse combining means responsive to said pulse generator for altering said train of pulses in a predetermined manner; and

auxiliary shifting means responsive to said pulse combining means for circulating a 1 level signal at a shift rate determined by the frequency of the output of said pulse combining means;

said auxiliary shifting means being connected to said primary shifting means for providing said phase pulses thereto.



4,032,905

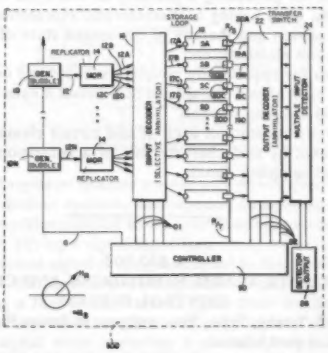
BUBBLE DOMAIN CIRCUIT ORGANIZATION

Thomas T. Chen, Yorba Linda, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 18, 1975, Ser. No. 614,401

Int. Cl.² G11C *11/02*

U.S. Cl. 340—174 TF **22 Claims**



1. A device for magnetic bubble domains comprising:

a magnetic sheet having propagation paths in which said domains can be propagated;

generator means for selectively producing said domains;

replicator means for splitting said domains from said generator means into a plurality of new domains which are applied to different propagation paths;

storage means for storing said domains;

input decoder means for selectively transferring said new domains from said replicator means to said storage register means;

detector means for detecting said domains;

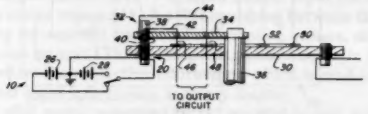
switch means associated with said storage means for selectively transferring said domains from said storage means and said detector means; and

output decoder means for selectively transferring said domains from said switch means to said detector means.

4,032,906
CONDITION SAMPLING AND INDICATING SYSTEM

Lewis B. Jackson, Jr., 135-1 S. Highland Ave., Ossining, N.Y. 10562

Filed July 21, 1975, Ser. No. 597,463
Int. Cl.² G08C 19/00
U.S. Cl. 340—196 10 Claims



1. A system for sensing, sampling and indicating the state of each of a plurality of electrical circuit elements comprising:

a plurality of circuit elements each being capable of assuming a plurality of discrete states;

a plurality of first circuit means each electrically connected to a different one of said plurality of circuit elements for sensing the state thereof and for assuming a condition indicative of said sensed state;

each of said first conduit means including inductive sensor means and a source of d.c. potential connected between one of said circuit elements and said inductive sensor means for providing a first current through said inductive sensor means when said circuit element is in one of its discrete states and providing a second current through said inductive sensor means when said circuit element is in a second of its discrete states;

said inductive sensor means assuming a first condition in which a first magnetic field is produced in response to said first current and assuming a second condition in which a second magnetic field is produced in response to said second current;

second circuit means for sampling said first circuit means and for producing a plurality of electrical sampling signals, each having a characteristic representative of said condition and thereby of the sensed state of one of said circuit elements; and

means for sequentially coupling said second circuit means to each of said plurality of first circuit means for effecting said samping thereof;

whereby the state of each of said circuit elements is represented by said characteristic of a corresponding one of said sampling signals.

4,032,907
REMOTE ALARM MONITORING AND CIRCUIT CONTROL SYSTEM

Danny J. Young, Tyler, Tex., assignor to James W. Fair, Tyler, Tex., a part interest

Filed Aug. 8, 1975, Ser. No. 603,013
Int. Cl.² G08B 19/00
U.S. Cl. 340—213 R 14 Claims

1. An alarm monitoring and control system adapted to be connected to a source of power comprising: one or more control stations each having

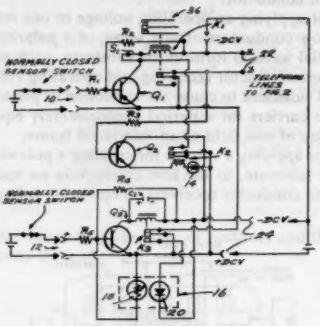
first and second sensing means for sensing the occurrence of at least first and second events, respectively,

first circuit means connected to said first sensing means for producing a first output signal,

second circuit means connected to said second sensing means for producing a second output signal electrically distinguishable from said first output signal,

third circuit means connected to each of said first and second circuit means for indicating the sensing of said first or second event and

a monitoring station located remotely from said one or more control stations, said monitoring station including monitoring circuit means for receiving said first and second output signals and indicating said first or second event and resetting

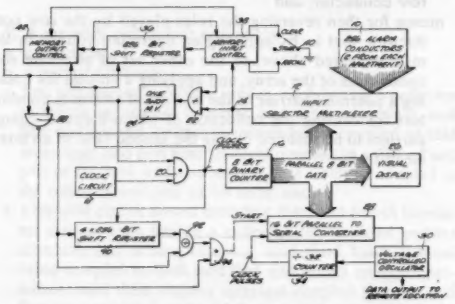


means for resetting at least one of said first and second circuit means following the termination of the event.

4,032,908
SECURITY ALARM SYSTEM

Richard C. Rice, and Barry N. Horn, both of Milwaukee, Wis., assignors to Automated Systems, Inc., Milwaukee, Wis.

Filed July 2, 1975, Ser. No. 592,425
Int. Cl.² G08B 25/00
U.S. Cl. 340—213 R 10 Claims

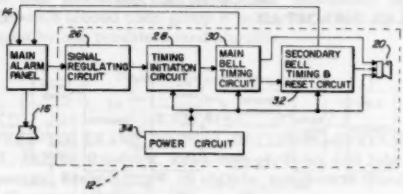


1. In an alarm system having a plurality of alarm conductors each wired to corresponding premises, a multiplexer coupled to said alarm conductors and containing means for connecting the connectors one at a time in sequence to an output terminal of the multiplexer, a binary counter coupled to said multiplexer to cycle the same through its sequence, a clock pulse circuit coupled to said binary counter to drive the same, alarm detector means coupled to the output of said multiplexer for detecting an alarm condition on any one of said alarm conductors, and display means coupled to said alarm detector means for visually identifying the alarm conductor upon which an alarm condition is detected, an alarm memory comprising a shift register coupled to the output of said multiplexer, said shift register having the same number of stages as the number of alarm conductors, said clock pulse circuit being coupled to said shift register to drive the same in synchronism with said multiplexer, the output of said shift register being coupled back to the input thereof to form a recirculating serial memory, and output circuit means coupled between the output of said shift register and the input of said alarm detector means for selectively applying the output of said shift register to the input of said alarm detector means to recall a previous alarm condition on one or more of said alarm conductors.

4,032,909
ARRANGEMENT FOR TESTING AN ALARM SYSTEM AND METHOD

William N. Boyce, Gering, Nebr., assignor to Eugene E. Karsten, Gering, Nebr., a part interest

Filed July 7, 1975, Ser. No. 593,651
Int. Cl.² G08B 19/00
U.S. Cl. 340—214 19 Claims



1. An arrangement for testing an alarm system which includes a main alarm activation circuit and a plurality of remote sensors connected with said circuit such that activation of at least one of said sensors activates said circuit, said alarm activation circuit including means for deactivating the circuit once activated and means for resetting the circuit once activated and subsequently deactivated, said arrangement comprising:

a. first means responsive to the activation of said alarm activation circuit for producing a first signal, said signal being applied to said deactivating means of said circuit for automatically deactivating said circuit;

b. an alarm;

c. second means connected with said first means and with said alarm for activating said alarm in response to said first signal; and

d. third means connected with said second means for deactivating said alarm and for producing a second signal a predetermined period of time after activation of said alarm, said second signal being applied to said resetting means of said alarm activation circuit for automatically resetting said circuit.

4,032,910
MICROWAVE ALARM

David Lipscombe Hollway, Gordon; Peter Ivan Somlo, Killarney Heights; John David Hunter, Carlingford, and Idris Gareth Morgan, Haberfield, all of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

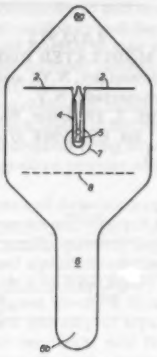
Filed Aug. 5, 1975, Ser. No. 602,056
Claims priority, application Australia, Aug. 5, 1974, 8418/74
Int. Cl.² G08B 21/00
U.S. Cl. 340—224 6 Claims

1. A microwave alarm device comprising:

a. a rigid body member,

b. a microwave receiving antenna secured to said body member to prevent relative movement between the body member and said antenna, and between elements of the antenna itself, and

c. a non-linear alarm indicator secured to the body member and connected to the antenna or energization by microwave power received thereby, said non-linear alarm indicator comprising a hot carrier diode connected across the antenna, a trigger circuit connected across the hot carrier diode and comprising a silicon controlled rectifier and a potential divider circuit connected to the control electrode of the rectifier and across the hot carrier diode, and a passive indicator device connected to said trigger circuit for activation thereby to produce a distinct alarm

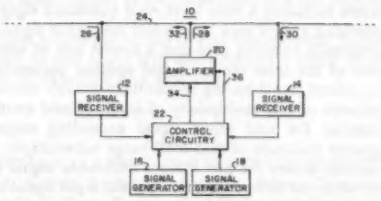


signal at a predetermined signal level delivered by the diode and antenna combination.

4,032,911
SIGNAL REPEATER FOR POWER DISTRIBUTION LINE COMMUNICATION SYSTEMS

Waymon A. Melvin, Jr., Raleigh, N.C., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1976, Ser. No. 661,594
Int. Cl.² H04M 11/04
U.S. Cl. 340—310 A 4 Claims



1. A signal repeater suitable for use with power distribution line communication systems, said repeater comprising:

a signal amplifier coupled to a power distribution line, said amplifier having a signal input line;

first and second signal receivers coupled to the distribution line, said first receiver providing a first output signal when receiving a first predetermined signal from the distribution line and said second receiver providing a second output signal when receiving a second predetermined signal from the distribution line;

first and second signal generators;

a bistable latch circuit having first and second input terminals and first and second output terminals; and

first and second transmission gates each having signal input, signal output, and control input lines, with the signal input lines of the first and second transmission gates respectively coupled to the first and second signal generators, with the signal output lines of the first and second transmission gates coupled to each other and to the signal input line of the signal amplifier, and with the control input lines of the first and second transmission gates respectively coupled to the first and second output terminals of the latch circuit;

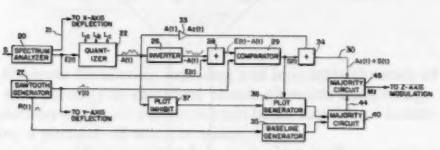
said first and second input terminals of said latch circuit being respectively coupled to the first and second receivers so that a first output signal from the first receiver sets the latch circuit in a condition which turns on the first

transmission gate if the latch circuit has not already been set in a condition to turn on the second transmission gate.

4,032,912
INTENSITY MODULATED DISPLAY SYSTEM

David E. Wood, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 3, 1974, Ser. No. 511,813
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 A 7 Claims



1. A system for displaying a continuously variable analog input signal having variations of three independent parameters, comprising:

a. input means for receiving said input signal to be displayed;

b. display means coupled to said input means for displaying said input signal as a final signal upon a two-dimensional surface having a pair of mutually orthogonal parameter axes, a first one of said axes corresponding to an entire range of allowable values of a first one of said parameters and the remaining one of said axes having a range corresponding to a submultiple of the total allowable value range of another parameter;

c. first means responsive to said input signal for providing a quantized signal having one of a multiplicity of discrete levels including a zero level, said quantized signal being provided at said zero level when said input signal has an amplitude between zero and a lowest one of said multiples of the total range of said another parameter, said quantized signal having sequentially greater discrete amplitudes of said multiplicity of levels of said another parameter for said input signal exceeding sequentially greater multiples of said total range submultiple;

d. second means for providing a difference signal proportional to the difference between said input signal and said quantized signal;

e. local signal generating means for providing a periodically varying comparative signal, each period of said comparative signal being associated with substantially a single value of said first parameter and

f. comparator means for generating an additional signal whenever said difference signal exceeds said comparative signal;

g. third means for applying said additional signal to said display means to vary the intensity thereof to cause those areas of the displayed final signal that correspond to portions of said another parameter of said input signal exceeding successively greater ones of the multiplicity of levels of said quantized signal to have successively greater intensities for each value of said first parameter; and

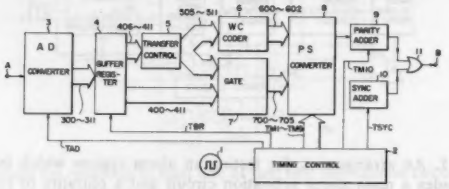
h. fourth means for applying another signal to said display means to cause the boundary between successive portions of said display having different intensities to be formed as a curve in accordance with the amplitude of said another parameter of said input signal relative to said quantized signal level to indicate the incremental value of said another parameter of said input signal relative to the general level thereof;

i. one of a succession of said two-dimensional surfaces being generated in a sequential manner for each sequential value of a remaining one of said three parameters to display the variation thereof in accordance with the variation in the first and another parameters.

4,032,913
CODING EQUIPMENT PROVIDING COMPRESSED CODE

Masami Okamura, Musashino; Fumio Aoki, Yokohama; Yoshihiro Sano, Katsuta; Jun-ichi Makino, Hitachi; Yoshiteru Miki, Hitachi; Hiroshi Sasaki, Hitachi, and Kazuo Seo, Hitachi, all of Japan, assignors to Hitachi, Ltd. and The Tokyo Electric Power Co., Inc., both of, Japan

Filed Apr. 9, 1974, Ser. No. 459,386
Claims priority, application Japan, Apr. 9, 1973, 48-39483
Int. Cl.[3] H03K *13/02*
U.S. Cl. 340—347 AD 4 Claims

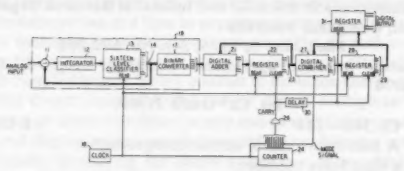


1. A coding equipment for encoding a physical quantity comprising analog-digital converting means for converting the physical quantity to a digital code signal, said analog-digital converting means including discriminator means having comparator means for discriminating whether the physical quantity is larger than a predetermined value or not, selecting means for selecting one of a plurality of predetermined different reference values in accordance with the output of said discriminating means, means for determining a weight for the digits of the digital code signal, said comparator means comparing the physical quantity with a value which is a function of the selected reference value and a weight which is predetermined depending on the position of each of the digits constituting the digital code signal, and compressing means for determining the position of the most significant digit in said digital code signal and for compressing said digital code signal in dependence on the position of the most significant digit in said digital code signal.

4,032,914
ANALOG TO DIGITAL CONVERTER WITH NOISE SUPPRESSION

James Charles Candy, Convent Station, and Yau-Chau Ching, Morganville, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 23, 1976, Ser. No. 679,774
Int. Cl.[3] H03K *13/175*
U.S. Cl. 340—347 AD 9 Claims



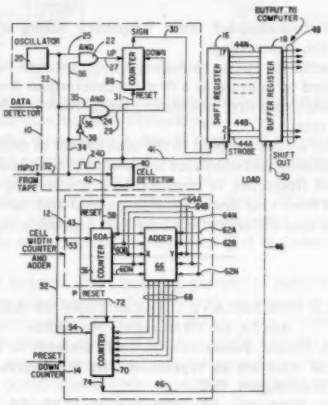
1. In a digital message transmission system having a direct feedback coder producing an encoded replica of an input signal, said coder including quantizing means having multiple levels and the encoded replica including first code groups of a first plurality of digital bits, a converter for changing the encoded replica to a pulse code modulated signal of high signal resolution including second code groups of several digital bits, said converter comprising first accumulating means for receiving each of the first code groups and producing an output signal indicative of a running sum of a predetermined plurality of the received code groups, second accumu-

lating means connected to receive the output signal and summing the negative of same for one portion of said predetermined plurality and summing the positive of same for another portion of said predetermined plurality to produce a net sum wherein the successive outputs of said coder during the one portion are included in the net sum an increasing number of times and the successive outputs of said coder during the other portion are included in the net sum a decreasing number of times, and output means coupled to said second accumulating means and producing the pulse code modulated signal wherein each second code group is indicative of one net sum produced by one predetermined plurality.

4,032,915
SPEED-TOLERANT DIGITAL DECODING SYSTEM

John L. Shanks; Randol R. Read, both of, Tulsa, and John W. Supernaw, Broken Arrow, all of Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed July 23, 1975, Ser. No. 598,314
Int. Cl.² H04L *3/00*
U.S. Cl. 340—347 DD **1 Claim**



1. A pulse-width signal-decoding system into which a signal passes, said signal comprising a plurality of adjacent cells, each defined at the ends by a rapid transition of a signal amplitude in a first direction and at some intermediate point by a rapid transition of the signal amplitude in a second and opposite direction, comprising:

a. data-detecting means for examining each cell to produce a logical 1 or a logical 0, depending only on whether said intermediate point occurs in one or the other half width between said ends of each cell;

b. sync-cell detector means for examining each cell to detect the presence of a sync cell (defined as being of at least approximately double normal cell width) and producing an unloading pulse therefrom;

c. shift register means coupled to said data-detecting means for temporary separate adjacent storage of the adjacent data bits comprising said logical 1s and said logical 0s detected by said data-detecting means;

d. a buffer register coupled to said shift register; and

e. means responsive to said unloading pulse from said sync-cell detector, at the occurrence of a sync cell, to load said shift register into said buffer register:

wherein said data-detecting means comprises:

a. up-down counter means having an up input, a down input, an output indicating the sign of the count, and a reset terminal;

b. an oscillator;

c. a signal input line;

d. a first AND gate with output connected to said up input, one input connected to said oscillator, and the second input connected to said signal input line;

e. a second AND gate and an inverter, said second AND gate with output connected to said down input, one input connected to said oscillator, and the second input connected through said inverter to said signal input line;

f. said output of said up-down counter connected to said shift register means; and

g. cell-detector means connected to said input signal line for producing a cell edge signal at the start of each cell, the output of said cell detector being connected to said reset terminal of said up-down counter and to a shift input of said shift register:

and wherein said sync-cell detector means comprises:

a. a cell-width counter having an input terminal connected to said oscillator, a reset terminal connected to said cell detector means, and a plurality of output leads for representing the count as a multibit binary number;

b. a binary adder means having a first plurality of input terminals, a second plurality of input terminals, and a plurality of output terminals, said first input terminals connected systematically to the corresponding output of said cell-width counter, said second inputs being systematically connected to said first inputs at terminals, each one less than the corresponding said first plurality of terminals, in a way to represent a binary number of one-half the value of the number on said first input terminals, whereby the signal on said output terminals represents 1.5 times that on said output leads of said cell-width counter;

c. a preset downcounter having a plurality of input leads, connected systematically to the corresponding said plurality of output leads of said adder means and a down count input connected to said oscillator;

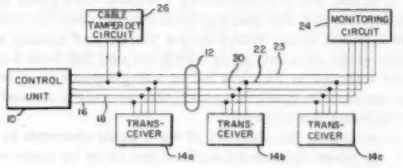
d. means connected to said downcounter and to the cell detector means to preset it to the number represented by said adder output at the occurrence of a cell edge signal; and

e. output means connected to said downcounter to indicate when its said count is 0, said count of 0 being an indication of detection of a sync cell.

4,032,916
INTRUSION ALARM CABLE SUPERVISION SYSTEM

Aaron A. Galvin, Lexington; James B. Edson, Concord, and James O. C. Bean, Boston, all of Mass., assignors to American District Telegraph Company, New York, N.Y.

Filed May 27, 1975, Ser. No. 581,131
Int. Cl.² G08B *29/00*
U.S. Cl. 340—409 **8 Claims**



1. For use in an intrusion alarm system having a control unit and at least one transceiver interconnected in parallel to a single multiconductor cable having a transmitter line, a receiver line, a tamper line, and a ground line, a first end of said cable being connected to said control unit, a cable supervision system comprising:

a monitoring circuit coupled to the second end of said cable remote from said control unit and including:

a first circuit connected to the transmitter line and operative to monitor at least one signal condition thereon;

a second circuit connected to the receiver line and operative to monitor a signal condition thereon; and

a third circuit connected to the tamper and ground lines and providing a predetermined impedance only under proper signal conditions sensed on said cable by said first and second circuits;

detector means at the first end of said cable opposite to said monitoring circuit connected to said tamper and ground lines and operative to detect a change in said predetermined impedance; and

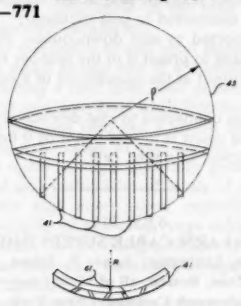
alarm means coupled to said detector means and operative to provide an output signal indication of an alarm condition when the detected change in impedance exceeds a predetermined threshold level.

4,032,917

SYNTHESIS TECHNIQUE FOR CONSTRUCTING CYLINDRICAL AND SPHERICAL SHAPED WAVE GUIDE ARRAYS TO FORM PENCIL BEAMS

Edward Chin, Rego Park, N.Y., and Leonard Schwartz, Montville, N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Aug. 21, 1975, Ser. No. 606,445
Int. Cl.² H01Q *13/10*
U.S. Cl. 343—771 **2 Claims**



1. A method of constructing a slotted wave guide structure having unequal slot spacings such that the structure will generate a pencil beam, comprising a plurality of closely adjacent wave guide elements all of which are end fed from a common feed wave guide which is fed at a single point so as to permit the antenna to conform to a regular geometric curved surface comprising the steps of:

a. arranging the plurality of wave guide elements in a shape to cover the curved surface but so as to cover no more than one half thereof;

b. determining the required phase function of each wave guide element in the antenna to result in an in phase condition at a phase plane which has a normal vector parallel to the desired pencil beam peak;

c. plotting the phase functions so determined with respect to length along each wave guide element;

d. plotting on the same plot therewith the running phase inside said wave guide element;

e. finding the points of intersection of said running phase lines and said phase functions; and

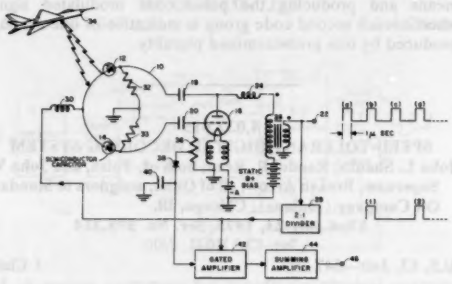
f. cutting slots at the distance along the wave guide corresponding to said points of intersection in each of said wave guide elements.

4,032,918

DUAL CHANNEL RADIO FREQUENCY FUZING SYSTEM

George F. Masin, Anaheim, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 30, 1964, Ser. No. 364,893
Int. Cl.² F42C *13/04*
U.S. Cl. 343—7 PF **5 Claims**



1. In a dual-channel radio frequency fuzing system the combination comprising:

a. an oscillator circuit including a loop antenna tank circuit adapted to operate at a first predetermined frequency in response to a first modulating signal having a first repetition rate,

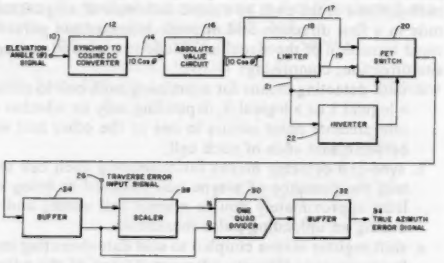
b. circuit means coupled to the tank circuit of said oscillator for causing said oscillator to operate at a second predetermined frequency in response to a modulating signal derived from said first modulating signal and having a repetition rate different than said first repetition rate.

4,032,919

DEVICE FOR SECANT CORRECTION OF AZIMUTH DATA IN TRACKING RADARS

Stephen J. Senger, Jamestown, N. Dak., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 11, 1976, Ser. No. 713,454
Int. Cl.² G01S *9/02*
U.S. Cl. 343—7.4 **6 Claims**



1. A device for adjusting traverse error signals in a tracking radar to obtain a true azimuth error signal comprising:

a. means for converting a signal representative of elevation angle of said tracking radar to a signal proportional to the cosine of said elevation angle;

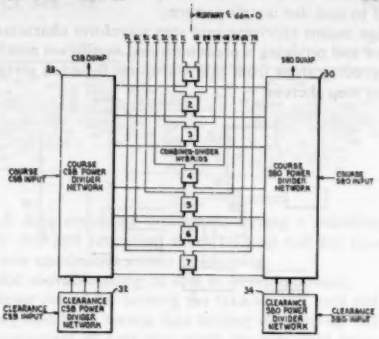
b. means for limiting said signal proportional to the cosine of said elevation angle to a minimum value representative of a maximum elevation angle to produce a correction factor signal;

c. means for dividing said traverse error signals by said correction factor signal to obtain said true azimuth error signal.

4,032,920
TWO-FREQUENCY INSTRUMENT LANDING SYSTEM WITH INTEGRAL MONITOR

Edwin J. Martin, Jr., Kansas City, and Akemichi Yamada, Raytown, both of Mo., assignors to Wilcox Electric, Inc., Kansas City, Mo.

Filed Sept. 2, 1975, Ser. No. 609,627
Int. Cl.² G01S 1/16, 1/18
U.S. Cl. 343—108 R 10 Claims



1. In a two-frequency capture-effect instrument landing system, the combination comprising:

means for generating a course signal of a first frequency having a carrier component that includes sidebands and a separate component that includes sidebands only;

means for generating a clearance signal of a second frequency having a carrier component that includes sidebands and a separate component that includes sidebands only;

a single antenna array having a number of pairs of radiating elements symmetrically disposed on opposite sides of a navigational centerline, a portion of said number of pairs constituting a group of element pairs adapted to radiate both course-frequency and clearance-frequency power;

carrier power distribution apparatus receiving said carrier components of said course and clearance signals and having a number of outputs corresponding to said pairs of elements,

said carrier power distribution apparatus including means for effecting unequal power division of the received carrier components and delivering combined course and clearance power at desired relative amplitudes from the outputs thereof corresponding to said group of element pairs and exclusively course power at desired relative amplitudes from the remainder of its outputs;

sideband power distribution apparatus receiving said sidebands only components of said course and clearance signals and having a number of outputs corresponding to said pairs of elements,

said sideband power distribution apparatus including means for effecting unequal power division of the received sidebands only components and delivering combined course and clearance power at desired relative amplitudes from the outputs thereof corresponding to said group of element pairs and exclusively course power from the remainder of its outputs; and

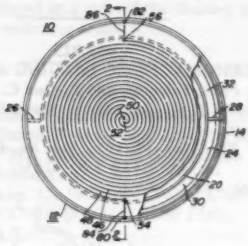
a number of combiner-divider devices, each associated with a corresponding element pair and having a pair of inputs connected with corresponding outputs of said carrier power distribution apparatus and said sideband power distribution apparatus respectively, and a pair of outputs connected with respective elements of the corresponding element pair for feeding the same,

each of said devices being operable to combine the carrier and sidebands only components delivered to its inputs and divide the resultant composite signal equally between the two elements of the pair.

4,032,921
BROAD-BAND SPIRAL-SLOT ANTENNA

Thomas V. Sikina, Jr., Chalfont; Robert H. Schafer, Perkasie, and Robert T. Klopach, Lansdale, all of Pa., assignors to American Electronic Laboratories, Inc., Colmar, Pa.

Filed Sept. 8, 1975, Ser. No. 610,985
Int. Cl.² H01Q 1/38, 13/18
U.S. Cl. 343—730 10 Claims

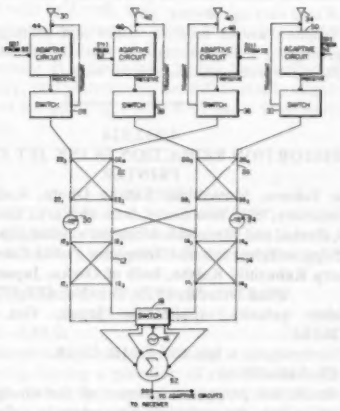


1. A broad-band antenna device having a wide frequency band comprising a variable aperture element, and a fixed aperture element comprising a slot antenna positioned about and electrically coupled to said variable aperture element, the variable aperture element having first and second output points providing balanced output signals with a 180° phase difference, and said slot antenna including first and second slot antenna elements with the first slot antenna element being electrically coupled with the first output point of said variable aperture element and the second slot antenna element being electrically coupled with the second output point of said variable aperture element.

4,032,922
MULTIBEAM ADAPTIVE ARRAY

Joseph H. Provencher, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 9, 1976, Ser. No. 647,828
Int. Cl.² H01Q 3/26
U.S. Cl. 343—854 6 Claims



1. A system comprising:

a Butler matrix including at least a plurality of input ports,

a first plurality of hybrid couplers coupled to said input ports, a plurality of phase shifters coupled to said first plurality of hybrid couplers, a second plurality of hybrid couplers coupled to said plurality of phase shifters;

a plurality of antenna elements; and

a plurality of adaptive means, each being coupled between one of said plurality of antenna elements and a corresponding one of said second plurality of hybrid couplers for minimizing the amplitude of an undesired signal received by said one of said plurality of antenna elements to which it is coupled, each adaptive means including means for comparing said received signal with a reference signal to develop an error signal for feedback control.

4,032,923

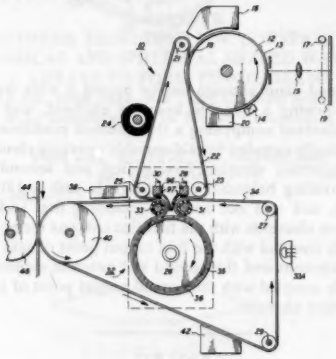
THERMOMAGNETIC IMAGING APPARATUS

Stephen F. Pond, Fairport, and Eugene C. Faucz, West Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 12, 1975, Ser. No. 631,289

Int. Cl.² G11B 5/02; G03G 19/00

U.S. Cl. 346—74.1 **21 Claims**



2. A thermoremanent transfer apparatus for thermomagnetically transferring an image from a slave web onto a master web comprising:

a transparent cylindrical carriage means,

web transport means cooperating with said carriage means for transporting said slave web and said master web into intimate contact around substantially the entire periphery of said carriage means; and

a radiation source located within said carriage means for producing a thermomagnetic transfer of the image from the slave web onto the master web.

4,032,924

DISTORTION REDUCTION IN INK JET SYSTEM PRINTER

Rikuo Takano, Musashino; Yutaka Ohota, Kodaira; Yoichi Yamamoto; Yuji Sumitomo, both of Nara; Toshio Kobayashi, Osaka, and Masahiko Aiba, Nara, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation and Sharp Kabushiki Kaisha, both of Osaka, Japan

Filed Oct. 30, 1975, Ser. No. 627,377

Claims priority, application Japan, Oct. 31, 1974, 49-126144

Int. Cl.² G01D 15/18

U.S. Cl. 346—75 **2 Claims**

1. In an ink jet system printer of the charge amplitude controlling type for recording characters in a dot matrix pattern by a sequence of charged ink drops, means compensating for the effects of charges on previous ink drops in a sequence on the current charged drops, comprising:

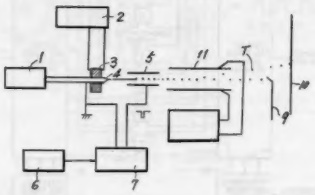
a read only memory (ROM) storing digital character generation output formats;

means controlling said ROM to output a selected character format;

a character generator responsive to said digital character format output from said ROM to produce a step waveform character signal;

dot matrix determining means controlling said character generator to correlate said step waveform character signal to said dot matrix pattern;

storage means receiving said step waveform character pattern and retaining a predetermined significant number of preceding steps from said waveform for each given current step therein;



proportioning means transmitting selectively attenuated magnitudes of said significant steps from said storage means;

an adder receiving and summing said attenuated magnitudes to provide a correction signal for a current step in said waveform as a function of said significant number of preceding steps; and

means synchronously adding said correction signal to its corresponding step in said stepped character signal to provide a stepped character output signal compensated for the effects of a predetermined significant number of preceding ink drops for each charged ink drop generated.

4,032,925

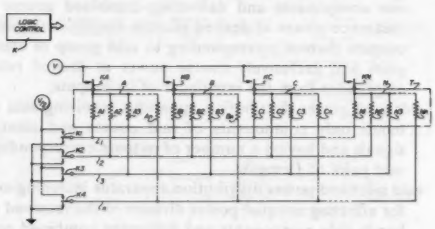
DRIVE CIRCUIT FOR THERMAL PRINTING ARRAY

Steven Kos, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed May 10, 1976, Ser. No. 684,568

Int. Cl.² G01D 15/10

U.S. Cl. 346—76 R **4 Claims**



1. In a drive circuit for a thermal printing array having a plurality of thermal resistance elements connected in a matrix of rows and columns;

the drive circuit comprising:

means for connecting a first source of voltage between a single column and selected ones of said rows to heat selected thermal resistance elements connected directly therebetween to printing temperatures;

the improvement comprising:

means for concurrently connecting only the balance of the rows to a second source of voltage intermediate that of said first source, to maintain the balance of the thermal

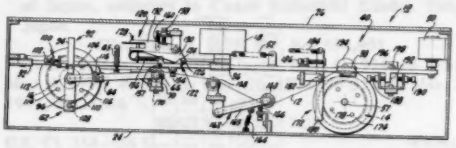
resistance elements in the array below said printing temperatures.

4,032,926

DATA RECORDING INSTRUMENT

George Robert Hale, 2531 Marin Ave., Berkeley, Calif. 94708

Filed May 12, 1976, Ser. No. 685,939
Int. Cl.² G01D 15/04, 15/16, 15/24
U.S. Cl. 346—79 10 Claims



1. A data recording instrument having a recording sheet supply roll and recording sheet take-up roll for charting at least one continuous sensor comprising:

a. rod movable along its axis in both directions,

b. lever means for turning the take-up roll, said rod engaging said lever means thus turning the take-up roll during movement of said rod along its axis, said lever means adjusting the degree of turning of the take-up roll in proportion to the amount of the recording sheet accumulated on the take-up roll,

c. marking means for impressing on the recording sheet the resultant output of at least one continuous sensor, said marking means connected to said rod and activated upon axial movement of said rod,

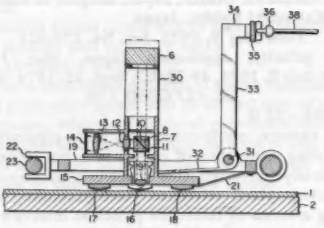
d. pulsing means for axially moving said rod.

4,032,927

HIGH DENSITY OPTICAL RECORDING APPARATUS

Takeshi Goshima, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 359,627, May 14, 1973, abandoned.
This application Oct. 24, 1974, Ser. No. 517,763
Claims priority, application Japan, May 19, 1972, 47-49688; May 22, 1972, 47-51092
Int. Cl.² G01D 18/00
U.S. Cl. 346—108 6 Claims



1. A high density optical recording apparatus comprising:

a recording medium having a light sensitive member on which recording is effected by sensing a beam;

means for producing a coherent beam modulated in accordance with a recording signal to be recorded on said recording medium;

beam splitter means disposed across an optical path of the coherent beam, said beam splitter means dividing the coherent beam into a first beam and a second beam;

an optical lens system for focusing the first beam onto said recording medium to optically write the recording signal in said recording medium;

interference optical means for measuring the clearance between said optical lens system and a surface of said recording medium by an interference fringe pattern, said interference optical means including; optical means for directing at least one of said beams, to wit, the second beam and the first beam which has been reflected by said recording medium and is inverted through said optical lens systems, in such a direction that the two beams are coherent, and a screen for forming an interference fringe pattern by said two beams; and

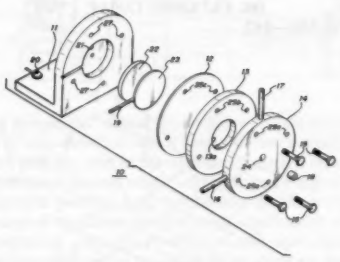
floating means carrying at least a portion of said optical lens system and said interference optical means, wherein said floating means includes three floating members, and wherein at least one of said floating members floats above the surface of said recording medium by virtue of high air pressure produced at a side of the floating member opposed to the recording medium.

4,032,928

WIDEBAND INK JET MODULATOR

John T. White, Grand Prairie, and Kenneth T. Lovelady, Irving, both of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Filed Aug. 12, 1976, Ser. No. 713,763
Int. Cl.² G01D 15/18; B23P 15/00
U.S. Cl. 346—140 R 15 Claims



1. A liquid jet modulator for production of ink droplets over a wide band of high operating frequencies, which comprises:

a. a housing having a cylindrical well in one face thereof,

b. a piezoelectric transducer disc seated in said well and conductively contacting the bottom of said well,

c. a disc electrode conductively bonded to the face of said transducer opposite the bottom of said well,

d. a flexible diaphragm closing said well,

e. a disc adjacent said diaphragm having a bore axially aligned with said well, and

f. a plate closing said bore to form a liquid chamber contiguous to said diaphragm and mechanically resonant under ink pressure at a frequency higher than said operating frequency, said plate having an orifice axially aligned with said bore for emitting a stream of liquid from said liquid chamber.

4,032,929

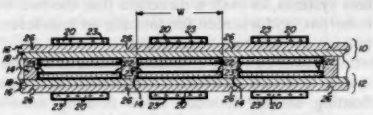
HIGH DENSITY LINEAR ARRAY INK JET ASSEMBLY

Kenneth H. Fischbeck, Dallas, and Richard H. Vernon, Richardson, both of Tex., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 28, 1975, Ser. No. 625,987
Int. Cl.² G01D 15/16
U.S. Cl. 346—140 R 21 Claims

19. In a linear array ink jet assembly: a longitudinally extending housing having a plurality of chambers, each separated from the other by longitudinally spaced wall means; a flexible member spanning said chambers and wall means and operably engaging said wall means to form a seal therebetween; a plurality of spaced-apart actuating means affixed to said flexible member, each of said actuating means being

affixed to respective portions of said flexible member corresponding to a respective chamber; each chamber including a droplet orifice longitudinally located between a respective pair of said wall means; said actuating means and said flexible



member being so constructed and arranged that upon activation of said actuating means, its respective portion of said flexible member will deform to decrease the volume of its respective chamber.

4,032,930

MECHANISM FOR THE APPLICATION AND REMOVAL OF A STYLUS WIRE ON STENCIL MATERIAL TO BE ENGRAVED

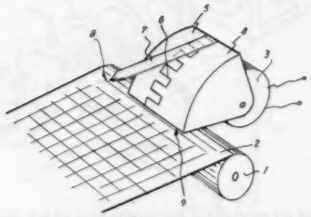
Julio G. Tauszig, Grecia 4020, Buenos Aires, Argentina

Filed Sept. 9, 1975, Ser. No. 611,820

Claims priority, application Argentina, Sept. 23, 1974, 255690

Int. Cl.² G03G *15/044*, *17/00*

U.S. Cl. 346—163 **6 Claims**



1. Apparatus for the application and removal of the engraving stylus of a stencil cutter toward and away from sensitive stencil material to be engraved including in combination: an electromagnet having a curved surface, a blade-like support of magnetic material fixed at one end thereof to bend thereabout, the support normally overlying the curved surface of said electromagnet in spaced relation with respect thereto, the free end of the support extending beyond the end of the electromagnet and said stylus used for applying stencil cutting pulses to the stencil material being attached to the free end of said support, said support being drawn into engagement with the curved surface of said electromagnet and bending substantially into conformity with the curved surface upon the energization of the latter, so that said stylus is positioned in contacting engagement with said stencil material positioned adjacent said electromagnet, the free end of said support remaining slightly spaced from said electromagnet to provide a dampening effect to said stylus as the latter passes over said stencil material.

4,032,931

MONEY TRANSFER DEVICE KEYBOARD TERMINAL

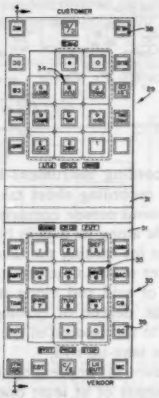
Floyd H. Haker, 6546 Linden Lane, Dallas, Tex. 57230

Filed Dec. 22, 1975, Ser. No. 643,103

Int. Cl.² H04Q *3/00*; G06K *15/18*; G06F *3/02*

U.S. Cl. 340—365 R **12 Claims**

1. A keyboard terminal for use with a central computer whereby money transactions between a vendor and customer may be electronically completed via the collective keyboard entries made by vendor and customer comprising, first and second discrete keyboards for respective use of vendor and customer, said keyboards extending oppositely from a raised central display device housing discrete displays on respective opposite sides thereof for respective viewing by vendor and customer, each of said first and second keyboards comprising a plurality of function activating keys and a plurality of numeric entry keys, the depressible upper portion of at least each said numeric entry key comprising a visible display means for identifying the associated key function, with said display means being recessed within the associated keyboard surface to limit readability thereof only within a restricted



angular field of view from vertical; said numeric entry keys arranged adjacently to form a predetermined geometric pattern; said numeric entry keys being physically aligned for depression contact of key carried probe means with an underlying connector matrix for generation of a related code word output definitive of that key function; means to realign said key numeric entry functions comprising means for physically moving one or more numeric entry keys in the plane of the keyboard and within the confines of the geometric pattern collectively defined by said numeric entry keys.

4,032,932

AUTOMATIC SHUTTER CONTROLS FOR CAMERAS

Tsukumo Nobusawa, Oizumi, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

Filed May 9, 1975, Ser. No. 576,021

Claims priority, application Japan, May 11, 1974, 49-52487; July 8, 1974, 49-78462; Sept. 25, 1974, 49-110205

Int. Cl.² G03D *7/08*

U.S. Cl. 354—23 D **11 Claims**

1. In a camera, photo-responsive pulse-generating means for generating a number of pulses in accordance with the logarithmically converted light intensity at an object which is to be photographed, reference pulse-generating means for generating a series of reference pulses at intervals from one reference pulse to the next which become progressively greater, shutter-operating means for opening a shutter of the camera to make an exposure, said shutter-operating means being operatively connected with said photo-responsive pulse-generating means for activating the latter just prior to opening of the shutter and being operatively connected to said reference pulse-generating means for activating the latter simultaneously with opening of the shutter, pulse-responsive means operatively connected with both of said pulse-generating means for receiving from said photo-responsive pulse-generating means the number of pulses generated thereby prior to opening of the shutter and for then receiving pulses from said reference pulse-generating means and for providing an output when the number of pulses received from said reference pulse-generating means has a predetermined relationship with respect to the number of pulses received from said photo-

responsive pulse-generating means, and shutter-closing means operatively connected with said pulse-responsive means for receiving said output therefrom and for responding to said output for closing the shutter.

4,032,933

INDICATION SYSTEM OF A CAMERA

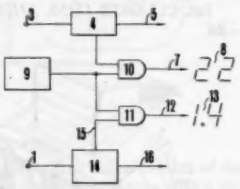
Tadashi Ito, Kanagawa; Masanori Uchidoi, Kawasaki; Tetsuya Taguchi, Kawasaki; Tokuichi Tunekawa, Kanagawa; Hiroshi Aizawa, and Yoshiyuki Takishima, both of Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1975, Ser. No. 554,901

Claims priority, application Japan, Mar. 4, 1974, 49-25558; Mar. 4, 1974, 49-25559; Mar. 20, 1974, 49-31805; Mar. 20, 1974, 49-31806

Int. Cl.² G03B 17/20

U.S. Cl. 354—23 D 4 Claims



1. An indication system of a camera comprising:

means to measure the brightness of an object;

means to set photographing information;

operating means coupled to said light measuring means and said photographing information setting means for obtaining an exposure value which corresponds to the output of both said means;

analog-digital conversion means coupled to said operating means to generate a digital signal which corresponds to the exposure value, wherein said conversion means has a plurality of detection means for a plural number of steps, one of which is placed in an activated state depending on said exposure value;

a plurality of diode arrays, each one of which is connected respectively to a corresponding one of said detection means;

an indication means connected to said diode arrays to digitally indicate said exposure value;

a pulse generation means; and

an exposure limit signal generation means responsive to said pulse generation means and to the last step of said detection means, wherein said signal generation means generates a signal to control the lighting state of said indication means when the output signals of both said means are supplied to said signal generation means.

4,032,934

AUTOMATIC FOCUSING SYSTEM

Kenneth L. Hendrickson, 7301 N. Ridge Blvd., Chicago, Ill. 60645, and Robert F. Johnston, 1112 Valley Drive, Wildwood, Ill. 60030

Filed Dec. 26, 1974, Ser. No. 536,666

Int. Cl.² G03B 3/10

U.S. Cl. 354—25 7 Claims

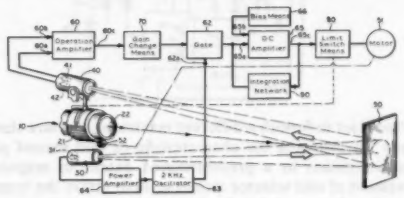
1. In a photographic apparatus having a focusing lens movable along an axis for passing light from a far or near object toward stationary means adapted to align light sensitive media inside the appartus, means for automatically moving the lens toward said stationary means when said object is far, and away from said stationary means when said object is near, comprising:

emission means secured to said apparatus for transmitting a train of light signals toward said object at a constant angle relative to said axis;

movable first and second photoreceptors disposed in spaced relationship in said apparatus; each of said photoreceptors adapted to simultaneously receive at least a portion of said light signals upon reflection thereof from said object, said first and second photoreceptors simultaneously producing, respectively, first and second electrical signals corresponding to the portions of said light signals received;

signal translation means for receiving said electrical signals from said respective photoreceptors and producing a difference signal corresponding to the difference between said electrical signals; said difference signal having a first polarity when said first electrical signal is larger than said second electrical signal, and said difference signal having an opposite polarity when said second electrical signal is larger than said first electrical signal;

mechanical means, responsive to said difference signal for



causing movement of said lens relative to said stationary means in one direction when said difference signal is of said first polarity, and in the opposite direction relative to said stationary means when said difference signal is of said opposite polarity; said mechanical means being further adapted to cause simultaneous movement of said photoreceptors until the portions of said light signals at said photoreceptors are equalized to produce an absolute minimal difference signal indicative of said object being properly focused on by said lens; and

gain means, having a first position for maintaining the amplification of said difference signal, and a second position for raising the amplification of said difference signal; said gain means being set to said first position when said lens is moved past a predetermined point on said axis away from said stationary means, said gain means being set to said second position when said lens is moved past said predetermined point toward said stationary means, whereby the amplitude of said difference signal is automatically increased when focusing on far objects.

4,032,935

EXPOSURE CONTROL FOR PHOTOGRAPHIC APPARATUS

Peter Lermann, Narring; Friedrich Stumpf, Munich, and Gunter Fauth, Unterhaching, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed May 10, 1976, Ser. No. 684,714

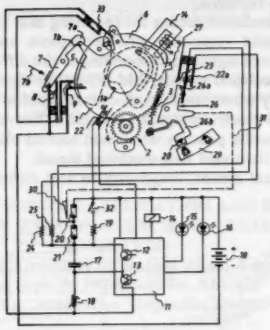
Claims priority, application Germany, May 16, 1975, 2521824

Int. Cl.² G03B 7/14

U.S. Cl. 354—29 11 Claims

1. In a photographic apparatus, an exposure control comprising a diaphragm shutter including a first portion movable from a first position toward one of a plurality of second positions each of which corresponds to a different aperture size whereby such movement of said first portion results in admission of scene light, and a second portion movable from a first position to a second position subsequent to movement of said first portion from said first position to thereby terminate the

admission of scene light; first photosensitive means having a characteristic such as to effect changes in exposure time and aperture size furnished by said shutter within a first range of scene brightnesses; second photosensitive means having a characteristic such as to effect changes in exposure time at a fixed aperture size within a second range of scene brightnesses which is contiguous to said first range; selector means movable between a plurality of positions in each of which said



shutter is set to furnish a different maximum aperture size; and means for changing the characteristic of said second photosensitive means to a predetermined extent in response to movement of said selector means so as to insure the transition from the characteristic of said first photosensitive means to the characteristic of said second photosensitive means when said shutter furnishes the maximum aperture selected by said selector means.

4,032,936

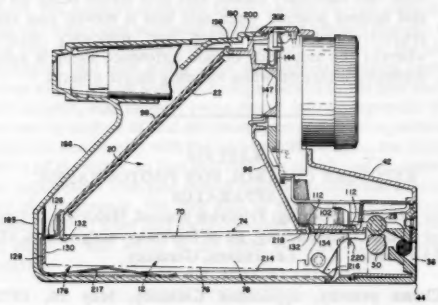
PHOTOGRAPHIC APPARATUS HAVING FILM CONTAINER LOCATING STRUCTURE

Bruce K. Johnson, Andover, and Donald H. Hendry, Rockland, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 554,779, March 3, 1975, abandoned. This application Mar. 16, 1976, Ser. No. 667,381

Int. Cl.² G03B *19/02, 17/00*

U.S. Cl. 354—83 **28 Claims**



27. A photographic camera for use with a film container having a substantially rectangular exposure aperture defined by a rectangular projection extending outwardly from the film container, said camera comprising;

a housing section having a bottom wall;

an exposure chamber cone formed of an integrally molded plastic structure and having portions thereof defining an opening, said portions being structured to receive the projection of the film container in substantially lighttight telescoping fashion to align the film container's exposure aperture with said opening of said cone, said housing section and said cone including complementary means for accurately aligning said cone in operative relationship to said housing section with said opening of said cone facing said bottom wall of said housing section, said housing section being structured to provide an opening through which the film container can be slidably inserted into said camera with the film container's exposure aperture facing said opening of said cone; and

means for pressing the film container against said cone when it is operatively positioned within said camera.

4,032,937

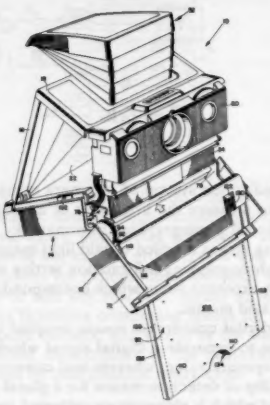
FILM UNIT LIGHT SHIELDING ADAPTER FOR PHOTOGRAPHIC APPARATUS

Joseph H. Wright, Marblehead, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sept. 10, 1975, Ser. No. 612,209

Int. Cl.² G03B *17/50, 17/26*

U.S. Cl. 354—86 **15 Claims**



1. A film unit light-shielding adapter that is configured to be removably coupled to a photographic apparatus of the type including a housing having a film exit slot therein and means for advancing a film unit along a predetermined path of travel within the housing and through the film exit slot such that at least a part of the film unit is located outside of the apparatus housing, the photographic apparatus also being of the type wherein a side of the film exit slot facing the interior of the housing is accessible to the user, said adapter comprising:

adapter means for operatively receiving a film unit that is advanced along the predetermined path of travel, said adapter means being configured to be readily inserted through the film exit slot, from the interior side thereof, such that a portion of said adapter means is located outside of the apparatus housing;

light blocking means, at least on said portion of said adapter means configured to be located outside of the apparatus housing, for blocking ambient light which otherwise may impinge upon photosensitive portions of that part of the film unit which is adapted to be located outside of the apparatus housing subsequent to the film unit having been advanced along the predetermined path of travel;

guide means on said adapter means for guiding a film unit, being advanced along the predetermined path of travel, into operative relationship with said adapter means; and

means on said adapter means being releasably engagable with structure of the photographic apparatus for releasably coupling said adapter to the apparatus and for accurately positioning said adapter in operative relation with the apparatus so that said guide means is located in a

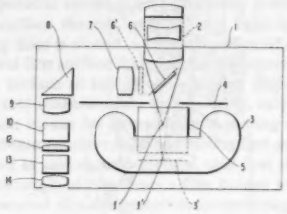
predetermined relationship with the film unit path of travel.

4,032,938

MINIATURE SINGLE LENS REFLEX CAMERA

Tohru Karikawa, and Koichi Kobayashi, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 15, 1976, Ser. No. 696,443
Claims priority, application Japan, June 20, 1975, 50-84778[U]
Int. Cl.² G03B 19/12
U.S. Cl. 354—155 3 Claims



1. A miniature single lens reflex camera of the type having, a portion for receiving a film cassette with a picture aperture portion, a slide type shutter positioned in front of said receiving portion, an angled mirror in front of said shutter for directing light from the object to a finder optical system located to one side of said receiving portion, said finder optical system including at least an eyepiece and a focusing lens located optically upstream of said eyepiece, the improvement comprising,

a. a glass block having parallel transparent surfaces positioned in the photographic optical path between said shutter and said picture aperture portion of said film cassette, and

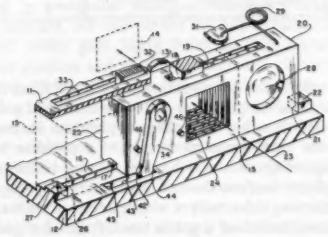
b. the combination of a trapezoidal prism, a right angled prism and an equilateral prism positioned between said focusing lens and said eyepiece in an arrangement to cause the optical path length between said lens and eyepiece to be substantially greater than the physical distance therebetween.

4,032,939

LENS CARRIER DAMPING MEANS

Robert George Elton, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,328
Int. Cl.² G03B 3/00
U.S. Cl. 354—197 3 Claims



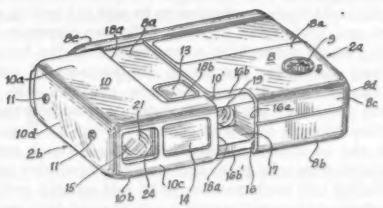
1. In a camera having a lens carrier; a stationary support structure including support means movably supporting said lens carrier; abutment means defining first and second abutment surfaces operatively engageable with said lens carrier to define respective first and second positions thereof; and resilient means adapted to resiliently bias said lens carrier toward at least one of said abutment surfaces with which said lens carrier is then in operative engagement; the improvement comprising: damping means assuming an operative condition during a final portion of the movement of said lens carrier between said two positions to reduce the impact of said lens carrier against the one of said abutment surfaces with which said lens carrier is being brought into operative engagement and assuming an inoperative condition during the initial portion of the movement of said lens carrier between said two positions; said damping means comprising a damping member provided with a cylindrical pivot shaft; bearing means defining a cylindrical bearing bore adapted to receive said pivot shaft with radial clearance between the confronting cylindrical surfaces of said bore and said shaft; a viscous damping fluid located in said radial clearance between said bore and said shaft; and damper rotating means causing pivotal movement of said damping member relative to said bearing means in response to said final portion of the movement of said lens carrier between said two positions.

4,032,940

RETRACTABLE CAMERA

Kwok Yan Chan, Hong Kong, assignor to W. Haking Industries, Ltd., North Point, Hong Kong

Continuation-in-part of Ser. No. 539,986, Jan. 10, 1975, abandoned. This application July 2, 1975, Ser. No. 592,402
Int. Cl.² G03B 13/02
U.S. Cl. 354—219 22 Claims



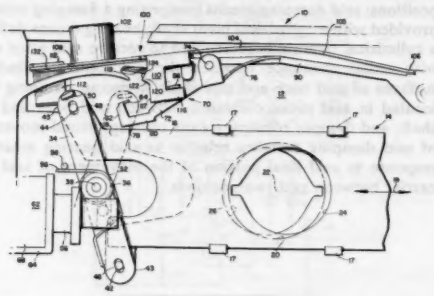
1. In a camera having a main camera section with an objective lens window exposing a light receiving surface for receiving picture-forming light rays which expose the film upon operation of camera shutter mechanism and a manually operable shutter release member, the improvement comprising a viewfinder section having front and rear normally exposed light receiving surfaces which present to the user a view of the scene to be photographed by the camera, said viewfinder section being mounted on said main housing section for movement between a retracted inoperative position, where the main housing section and viewfinder section form an overall assembly of maximum compactness, and an extended position where the viewfinder section is in an operative position to provide a view of the scene to be photographed said main camera section housing dust cover-forming means for providing a dust cover for said front and rear light receiving surfaces of said viewfinder section when said viewfinder section is in said retracted position and for exposing the same when the viewfinder section is in said extended position, and said viewfinder section having means for covering said shutter release member when said viewfinder section is in said retracted position and for exposing the same when the viewfinder section is in said extended position.

4,032,941

LATCHED SHUTTER SYSTEM HAVING AUTOMATIC DELAY OF LATCH RESET

Lawrence M. Douglas, South Easton; Patrick L. Finelli, Sudbury; Norman D. Staller, Beverly, and Frederick Slavitter, Needham, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 28, 1975, Ser. No. 608,677
Int. Cl.² G03B 9/08
U.S. Cl. 354—230 9 Claims



1. A photographic exposure control system for a photographic camera, the camera having means for mounting photographic film material at a given focal plane, said system comprising a blade mechanism, means for mounting said blade mechanism for displacement along a given blade path between a blocking arrangement precluding transmission of scene light to the focal plane and an unblocking arrangement defining an aperture value through which scene light is transmitted to the focal plane, drive means actuatable for displacing said blade mechanism between its said arrangements, control means energizeable for actuating said drive means to initially displace said blade mechanism toward its said blocking arrangement and then, after a predetermined time, to displace said blade mechanism to its said unblocking arrangement and back again so as to define an exposure interval during which scene light is transmitted to the focal plane, latching means for precluding displacement of said blade mechanism from its said blocking position, said latching means including a latch member displaceable between a latch position wherein said latch member is located in said blade path and an unlatch position wherein said latch member is displaced from said path, and manually operative means for displacing said latch member to its said unlatch position, for energizing said control means to actuate said drive means, and for subsequently displacing said latch member back to its said latch position, said manually operative means including means for delaying the displacement of said latch member back to its said latch position for a time substantially equal to or exceeding said predetermined time so as to allow escape of the blade mechanism from the latch member as said blade mechanism is displaced toward its said unblocking arrangement to define said exposure interval.

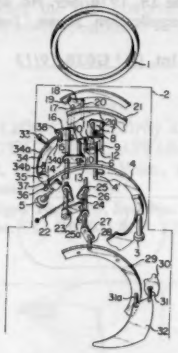
4,032,942

PRESSURE TYPE LENS TUBE FOR SINGLE LENS REFLEX CAMERA FOR INCORPORATION IN A FOLLOW-UP TYPE APERTURE-CONTROLLED CAMERA

Satoya Watanabe, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed May 23, 1975, Ser. No. 580,523
Claims priority, application Japan, May 31, 1974, 49-61899[U]; May 31, 1974, 49-61900[U]
Int. Cl.² G03B 9/02
U.S. Cl. 354—272 4 Claims

1. A lens tube for a single-lens reflex camera including a shutter mechanism on the camera body and having a plurality of aperture blades normally pressed in the aperture-opening direction, comprising, in combination, an interlocking member operably associated with said aperture blades for their displacement against the pressing force given them when the member is operated, a limiting member for stopping said interlocking member at a position corresponding to a predetermined aperture-setting operation to determine the position of said blades for a desired aperture, a release means provided in interlocked relation with the shutter mechanism to actuate



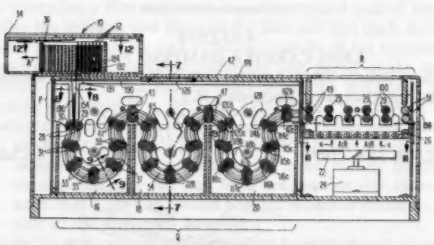
the shutter mechanism, and an operating member operable from the outside of the lens tube to actuate said interlocking member until the interlocking member is stopped by said limiting member during the initial stage of operation and to thereafter operate said release means, said release means being interlocked with said operating member for transmitting a release signal after aperture setting, said interlocking member, limiting member, release means and operating member being positioned in the lens tube.

4,032,943

DENTAL X-RAY FILM PROCESSING SYSTEM

Ernest Zwettler, Los Angeles, Calif., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed June 19, 1975, Ser. No. 588,562
Int. Cl.² G03D 17/00
U.S. Cl. 354—312 6 Claims



1. In a system for developing a plurality of films including a housing with developer, fixer and rinse tanks and a drying area therein, said housing including a position means receiver disposed for complemental receipt of a position means of a film storage magazine, said housing having a film receipt slot in a top planar surface thereof, a plurality of pairs of tangentially contacting drive rollers within a film guide track formed between two halves of a guide track frame for guiding films from said film receipt slot successively into and out of said developer, fixer and rinse tanks and into said drying area, a roller drive motor, a gear train connecting an output shaft of said roller drive motor to a driven roller of each roller pair, said gear train including a plurality of worm gears mounted on a shaft rotatably connected to said output shaft of said roller

drive motor, three tank gear drives corresponding to said three tanks each connected to one of said worm gears for driving pairs of rollers proximate said tanks, each tank gear drive including a drive gear meshed with one of said worm gears and a plurality of driven idler gears indirectly meshed in series with said drive gear for driving thereby, said pairs of rollers spaced along said film guide track so a leading edge of a film is between a next pair of rollers before a trailing edge has been released by a previous pair of rollers, the improvement comprising: a film storage magazine and a mechanism for sequentially dispensing films from said film storage magazine into said film receipt slot, said film storage magazine including:

a. an openable rectangular box having a sliding door at a first surface thereof, substantially light-tight when said sliding door is closed, a second surface of said box opposite said first surface disposed for contiquous contact with a top surface of said housing during dispensing of films from said magazine into said housing, said box including position means for complemental mating with said position means receiver, said box having first and second slots located in said second surface, said first slot for passage therethrough of film from a film holder within said box, said second slot for insertion therethrough of an index prong from said housing into engagement with teeth of a rack within said box and a third slot in a surface of said box parallel a direction of horizontal movement of said film holder and said rack within said box;

b. a film holder having a plurality of vertical film slots therethrough for receipt of single films, said film holder slideable horizontally within said box,

c. a rack having teeth along a lower surface and having pin receiving vertical slots in a lateral surface;

d. pins extending from fixed positions on a lateral surface of said film holder into said vertical slots of said rack, for preventing horizontal rack movement with respect to said film holder while permitting vertical rack movement with respect to said film holder;

e. a slider attached to said film holder and extending through said third slot in said box, for hand movement of said holder and rack together horizontally within said box;

wherein said first slot is aligned with said film receipt slot for passage of films from said box into said housing when said magazine is positioned on said housing with said position means and said position means receiver in complemental engagement; and said mechanism for sequentially dispensing films from said film storage magazine into said film reccipt slot including:

f. an index gear meshed with a gear of one of said tank gear drives for rotation therewith;

g. an index pin extending from a side surface of said index gear, remote from the axis of rotation thereof;

h. a horizontally moveable index tab slideably retained in said housing contacting said index pin as said index pin moves in a circular path, moveable horizontally upon such contact, tab movement for each complete rotation of said index gear being from an initial position to a second position and return, an extended planar portion of said tab forming a slideably moveable shutter door for opening and closing said film receipt slot, an upstanding portion of said tab forming said index prong extending out of said housing and protruding into said openable box through said second slot, having a beveled upper surface to engage any rack tooth which is in position for engagement when said magazine is positioned on said housing with said position means and said position means receiver in complemental engagement, whereby rotation of said index gear produces horizontal movement of said index tab and prong from an initial position to a second position and return, said movement resulting in opening and closing of said film receipt slot and, if said index prong is in engagement with said rack, advancement of said film holder and rack a distance by which contiguous film slots in said film holder are separated.

4,032,944

SEMICONDUCTOR DEVICE FOR GENERATING INCOHERENT RADIATION AND METHOD OF MANUFACTURING SAME

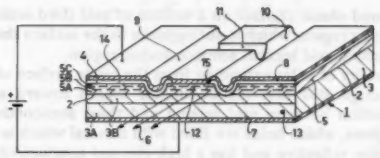
Teunis van Dongen, and Rudolf Paulus Tijburg, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,479

Claims priority, application Netherlands, Mar. 11, 1975, 7502844

Int. Cl.² H01L *33/00*

U.S. Cl. 357—17 **18 Claims**



1. A semiconductor device for generating incoherent electromagnetic radiation and comprising:

a. a semiconductor body having at least one diode with a p,n junction, said semiconductor body comprising:

i. a substrate region of first conductivity type,

ii. a first layer of secondconductivity type that comprises an active part and adjoins both said substrate region and a substantially flat first surface of siad body, and

iii. a substantially flat second surface that intersects said first surface and said p,n junction substantially at right angles, said substrate region and said first layer forming said p,n junction, said junction being capable when biased in the forward direction, of emitting recombination radiation from said second surface in a direction parallel to said p,n junction, said first surface having a groove which extends from said surface through at least the greater part of thickness of said first layer, at least said active part of said first layer being at least partially bounded by said groove and by said second surface, at least a part of said groove extending substantially parallel to said second surface,

b. connection conductor means associated respectively with said substrate region and said first layer,

c. an electrically insulating disposed over at least a major part of said first surface and comprising a contact window at said active part of said first layer, and

d. an electrically conductive electrode layer present on substantially the whole said first surface and on said insulating layer, said electrode layer adjoining said first layer within said contact window.

4,032,945

LIGHT EMITTING SEMICONDUCTOR DIODE

Mitsuhiro Mori, Kokubunji; Kazuhiro Ito, Tokyo; Makoto Morioka, Tokyo, and Yuichi Ono, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed July 30, 1976, Ser. No. 710,307

Claims priority, application Japan, July 30, 1975, 50-91909

Int. Cl.² H01L *33/00, 33/19*

U.S. Cl. 357—18 **14 Claims**

1. A light emitting semiconductor diode comprising:

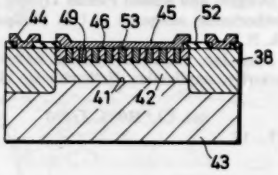
a first semiconductor region having a first conductivity type and a narrow forbidden band gap,

a second semiconductor region, abutting said first semicon-

ductor region, having the first conductivity type and a low impurity concentration,

a third semiconductor region, abutting said second semiconductor region, having a second conductivity type which is opposite to the first conductivity type,

a first ohmic contact disposed on the surface of said first semiconductor region, which is opposite to the surface thereof abutting said second semiconductor region,



a second ohmic contact on a surface of said third semiconductor region, which is not opposite to the surface thereof abutting said second semiconductor region,

a plurality of holes extending from the outer surface of and through said first semiconductor region toward a p-n junction between said second and third semiconductor regions, which holes are filled with a metal which is both highly reflective and has a high thermal conductivity.

4,032,946

APPARATUS FOR SELLING BETTING TICKETS

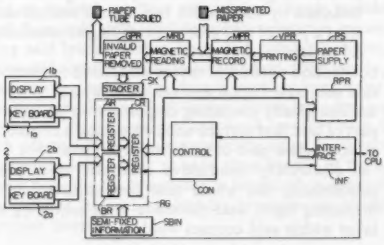
Yuzo Wakatsuki; Masanobu Miyake, both of Tokyo, and Kazuyuki Hano, Kawasaki, all of Japan, assignors to Fujitsu Ltd., Kawasaki and The Japan Racing Association, Tokyo, both of, Japan

Filed Sept. 8, 1976, Ser. No. 721,578

Claims priority, application Japan, Sept. 13, 1975, 50-111237

Int. Cl.[2] G06F *3/12, 7/38, 15/02, 15/28*

U.S. Cl. 364—900 **14 Claims**



1. An apparatus for use with a central processor in selling betting tickets wherein betting information recorded on an original betting ticket may be altered by said central processor in accordance with operator instructions and a new betting ticket containing altered betting information issued, said apparatus comprising means for reading the betting information from said original betting ticket, means for displaying said betting information, indication means responsive to said operator instructions for providing an output indicating the betting information to be altered, said central processor being responsive to said output of said indication means for altering the betting information so as to provide said altered betting information, and recording means for recording the altered betting information on said new betting ticket.

4,032,947

CONTROLLABLE CHARGE-COUPLED SEMICONDUCTOR DEVICE

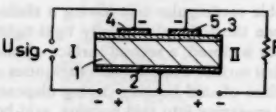
Güenther Kesel, and Reinhard Losehand, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 297,338, Oct. 13, 1972, abandoned. This application Jan. 2, 1975, Ser. No. 538,124

Claims priority, application Germany, Oct. 20, 1971, 2152293

Int. Cl.[2] H01L *29/78, 29/48, 27/10, 27/15*

U.S. Cl. 357—24 **12 Claims**



1. A semiconductor arrangement comprising a planar-shaped n- or p- type semiconductor substrate, a first electrode contacting the semiconductor substrate blocking-free on one side thereof, a layer of silicon dioxide not greater than 5000 nm thick covering the other side of said semiconductor substrate, a system of straight-line running electrical conductor paths insulated from each other electrically and defining at least two sets of which divide the surface of the SiO_2 layer into a net-like pattern, a plurality of electrodes coupled electrically to the semiconductor substrate capacitively and arranged on said silicon dioxide layer and arranged into electrode groups, and each adjoining electrode group is separated by electrode-free regions respectively, and in which all electrode groups are similar to each other, and the shortest distance "W" between each of the two electrodes within each individual group is not greater than:

$$W = (U \cdot \epsilon_H / N \cdot e)^{1/2}$$

where, (ϵ_H = dielectricity constant of the semiconductor, U = distance of the Fermi level from the lower band edge in an n-conducting semiconductor, or the upper band edge in a p-conducting semiconductor, respectively, N = net concentration of the doping atoms, and $e = 1.6\ 10^{-19}$ Coulomb), and wherein all electrode groups are arranged in pairs in the same fashion on one grid element of the matrix formed by said straight line electrical conductor paths on said silicon dioxide layer, and the individual electrodes of each individual group are electrically connected on one grid element at a time which forms the conducting path pattern in such a way, that in no electrode group two electrodes are connected to the same conductor path pattern and no two conductor paths are connected with the same electrode and at least a pair of controls wherein each conductor path, and each electrode of each electrode group can be individually addressed when said pair of controls supply voltages and detect current from said electrodes.

4,032,948

SURFACE CHARGE LAUNCHING APPARATUS

William E. Engeler, Scotia, and Jerome J. Tiemann, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 84,666, Oct. 28, 1970, abandoned. This application Feb. 12, 1973, Ser. No. 331,483

Int. Cl.[2] H01L *27/10, 29/78*

U.S. Cl. 357—24 **2 Claims**

1. Device for introducing levels of charge in surface charge apparatus in accordance with an information bearing signal comprising

a semiconductor substrate of one conductivity type having a surface adjacent portion,

a first conductive member insulatingly overlying said surface adjacent portion of said substrate,

means for applying a first biasing voltage to said first conductive member with respect to said substrate to form a first depletion region in the surface-adjacent portion of said substrate underlying said first conductive member having a surface potential of a first value in the absence of minority carriers in said first depletion region,

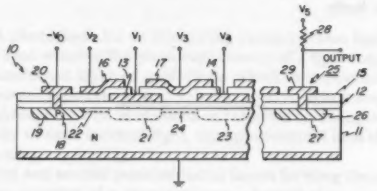
a region of opposite conductivity type in said surface adjacent portion of said substrate spaced from said depletion region,

a barrier region in said substrate between said region of opposite conductivity and said first depletion region,

means for applying a second biasing voltage to said region of opposite conductivity type with respect to said substrate to provide a potential in said region of opposite conductivity type of a second value with respect to said substrate,

the surface potential of said depletion region of said first value being energetic lower than the potential of said second value for minority carriers in said substrate,

a second conductive member insulatingly overlying said barrier region,



means for applying a control voltage between said second conductive member and said substrate for lowering the surface potential of said barrier region to a third value lower than said second value to cause the surface potential of said first depletion region to equilibrate with the potential of said region of opposite conductivity type thereby to establish in said first depletion region a predetermined level of charge dependent on said first and second values of voltage,

a plurality of spaced conductor members insulatingly overlying the surface adjacent portion of said substrate to form an information storage and transfer channel for the transfer of electrical charge along the surface adjacent portion of said substrate,

means for applying periodic phase related voltages to said spaced conductor members to incrementally move charge in said storage and transfer channel,

means for maintaining said first biasing voltage fixed during a period of said phase related voltages,

means for periodically transferring charge introduced in said first depletion region into a depletion region of said storage and transfer channel for transfer therealong.

4,032,949

INTEGRATED CIRCUIT FUSING TECHNIQUE

Robert W. Bierig, Sudbury, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 577,805, May 15, 1975, abandoned, which is a continuation of Ser. No. 435,612, Jan. 22, 1974, abandoned. This application Oct. 18, 1976, Ser. No. 733,743

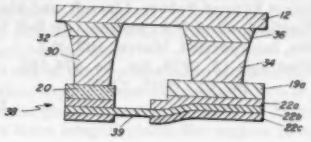
Int. Cl.² H01L *27/02, 23/48, 29/44, 29/52*

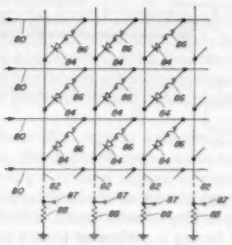
U.S. Cl. 357—51 **20 Claims**

1. In combination:

an integrated circuit substrate having a plurality of conductive regions on at least one surface thereof; and

fuse means upon said surface, said fuse means having first and second terminals and a fusible link, said fusible link being coupled between said first and second terminals, said first and second terminals each forming a portion of at least one of said conductive regions, and said fusible link being suspended between said first and second terminals, said fusible link being substantially coplanar with adjacent portions of said first and second terminals, the





density of current through said fusible link being substantially uniform, and lateral surfaces of said fusible link being separated from any layers of solid material.

4,032,950

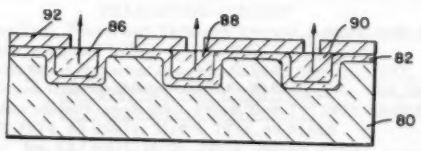
LIQUID PHASE EPITAXIAL PROCESS FOR GROWING SEMI-INSULATING GAAS LAYERS

G. Sanjiv Kamath, Malibu, and Bradley W. Smith, Oxnard, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 530,336, Dec. 6, 1974, Pat. No. 3,994,755. This application Aug. 16, 1976, Ser. No. 714,872

Int. Cl.² H01L *33/00*

U.S. Cl. 357—17 **2 Claims**



1. A gallium arsenide solid state display structure comprising:

a. a gallium arsenide substrate having a plurality of cavities therein,

b. a semi-insulating layer of gallium arsenide covering said cavities, and

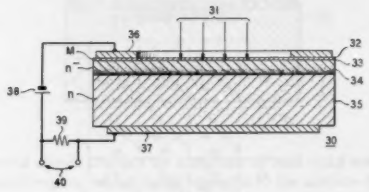
c. a plurality of distinct and electrically isolated gallium arsenide epitaxial islands formed on portions of said semi-insulating layer and coplanar with the other remaining portions of said semi-insulating layer, whereby said structure is comprised of but one inter metallic III-V compound material which is crystallographically, electrically and physically suitable for the construction of monolithic GaAs light emitting displays.

4,032,951

GROWTH OF III-V LAYERS CONTAINING ARSENIC, ANTIMONY AND PHOSPHORUS, AND DEVICE USES

John Christian De Winter, Howell Township, Monmouth County; Robert Edward Nahory, Lincroft, and Martin Alan Pollack, Westfield, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 13, 1976, Ser. No. 676,556
Int. Cl.² H01L *33/00*
U.S. Cl. 357—17 17 Claims



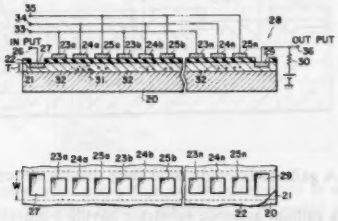
1. An electronic device subassembly article of manufacture comprising a plurality of solid layers, including a first layer of solid material having a surface at least a portion of which is coated with a second layer adhering thereto, said second layer being a crystalline intermixture characterized in that said intermixture has at least one Group III constituent, including gallium, and at least three Group V constituents, including arsenic, antimony and phosphorus, said second layer being such that said crystalline intermixture has an essentially smooth surface accommodating deposition of additional layers of material in said subassembly or in electronic devices incorporating said subassembly in manufacture.

4,032,952

BULK CHARGE TRANSFER SEMICONDUCTOR DEVICE

Shinya Ohba, Kokubunji; Iwao Takemoto, Kodaira, and Masaharu Kubo, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 3, 1973, Ser. No. 347,426
Claims priority, application Japan, Mar. 7, 1973, 48-26113; Apr. 3, 1972, 47-32655; July 26, 1972, 47-74865; Jan. 16, 1973, 48-6645; Jan. 24, 1973, 48-9521; Feb. 2, 1973, 48-2966; Feb. 2, 1973, 48-2967
Int. Cl.² H01L *29.78*
U.S. Cl. 357—24 73 Claims



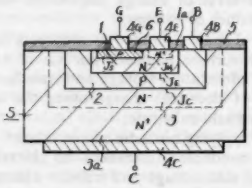
1. A bulk charge transfer semiconductor device comprising:
a substrate;
a semiconductor body wherein majority carriers are to be transferred, disposed on the substrate, which is electrically isolated from the substrate;
a series of electrodes disposed over the semiconductor body while being electrically isolated from the semiconductor body;
means for introducing majority carriers into the semiconductor body, disposed on the semiconductor body, disposed on the semiconductor body adjacent one end of said series of electrodes;
means for detecting said introduced majority carriers, disposed on said semiconductor body adjacent the other end of said series of electrodes; and
means for applying voltages to the electrodes for forming depletion regions within the semiconductor body so that majority carriers are pushed out by said depletion regions toward said detecting means, thereby transferring introduced majority carriers along the semiconductor body; and wherein
the thickness of the semiconductor body is less than the depth of said depletion regions and the width of the semiconductor body, which is the dimension of the semiconductor body perpendicular to the direction in which the majority carriers are transferred, is less than the total length of the width of an electrode in a direction perpendicular to the transit direction of the majority carriers and parallel to the surface of said semiconductor body and twice the depletion width spread from the edges of an electrode toward a direction perpendicular to said transit direction and parallel to the surface of said semiconductor body.

4,032,953

SENSING CIRCUITS

Sadao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 25, 1975, Ser. No. 571,687
Claims priority, application Japan, May 10, 1974, 49-52108
Int. Cl.² H01L *29/66, 29/74, 27/02;* H03K *3/26*
U.S. Cl. 357—25 2 Claims



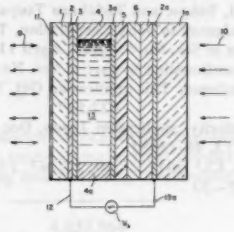
1. A sensing circuit which comprises a four-terminal semiconductor device having a first semiconductor region of one conductivity type, a second semiconductor region of the opposite conductivity type adjacent said first region with a first semiconductor junction therebetween, a third semiconductor region of the same type as said first region adjacent said second region with a second semiconductor junction therebetween, said first and third regions of the semiconductor device having an impurity concentration of substantially the same order of magnitude and a fourth semiconductor region of the same conductivity type as said second region being provided in contact with said first region at a position which is spaced from said first junction by a distance which is smaller than the diffusion distance of the minority carriers forming a potential barrier, a potential source, a bias circuit for said second semiconductor region, a sensing element connected between said fourth and first semiconductor regions, said sensing element having a resistance value dependent upon a given environment condition, a biasing circuit for said first semiconductor region, a load connected between said potential source and said third semiconductor region, and an output terminal connected to said third semiconductor region.

4,032,954

SILICON SINGLE CRYSTAL CHARGE STORAGE DIODE

Jan Grinberg, Los Angeles; Lewis M. Fraas, Malibu; William P. Bleha, Jr., Pacific Palisades, and Paul O. Braatz, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed June 1, 1976, Ser. No. 691,652
Int. Cl.² H01L 27/14
U.S. Cl. 357—30 5 Claims



1. A photodiode for an alternating current driven light valve of the type wherein the photocapacitance of a light responsive semiconductor layer of said diode which is supported on a transparent substrate of said valve to receive light transmitted therethrough can be modulated in response to changes in the intensity of such incident light, the improvement in said diode comprising:

a. first and second semiconductor layers forming the rectifying junction of a charge storage photodiode;

b. said first layer being a light responsive single crystal silicon photoconductor the photocapacitance of which can be modulated in response to changes in the intensity of said incident light and said second layer being a semiconductor having a polarity opposite to that of said first layer;

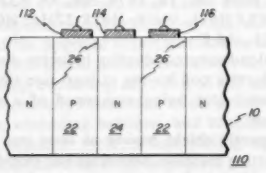
c. said first layer comprising a first region of semiconductor material having a low density of defect centers and a second region of semiconductor material having a higher density of defect centers, said second region being contiguous with said junction and said first region being contiguous with said second region and being exposed to receive said incident light which is effective to generate charge carriers which are stored in said second region and which change the photocapacitive depletion width adjacent said junction to enhance the sensitivity of said diode, the defect centers of said second region of said single crystal silicon first layer forming slow recombination centers.

4,032,955

DEEP DIODE TRANSISTOR

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 9, 1976, Ser. No. 712,716
Int. Cl.² H01L 29/72, 29/00, 29/04
U.S. Cl. 357—34 24 Claims



1. A semiconductor transistor comprising

a body of semiconductor material having two opposed major surfaces forming respectively the top and bottom surfaces of the body, a predetermined level of resistivity, a predetermined first type conductivity, a preferred crystal structure and a vertical axis substantially perpendicular to the major opposed surfaces and aligned substantially parallel with a first preferred crystal axis of the material of the body;

at least one of the opposed major surfaces having a predetermined crystal planar orientation which is one selected from the group consisting of (100), (110) and (111);

at least three integral planar-like regions of alternate and opposite type conductivity formed in the body to form, respectively, the collector, the base, and the emitter regions of the transistor;

at least one of the planar-like regions comprising recrystallized semiconductor material of the body having a predetermined type conductivity and a predetermined level of resistivity and so oriented within the body as to be aligned with a second preferred crystal axis of the material of the body;

each of the planar-like regions extending between, and terminating in, the opposed major surfaces of the body, the region having a vertical aligned substantially parallel with the vertical axis of the body and opposed end surfaces, each of which is coextensive with a respective one of the opposed major surfaces;

the recrystallized material is formed in situ by the migration of a melt of metal-rich semiconductor material of the body through the material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the first preferred crystal axis and the vertical axis of the body and has a predetermined level of concentration of the metal of the melt as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration and the metal is distributed substantially uniformly throughout the entire region;

the metal consisting of at least one dopant impurity material to impart the type conductivity and level of resistivity to the planar region;

a P-N junction formed by the abutting, contiguous surfaces of the material of each of the planar regions and the material of the body, and

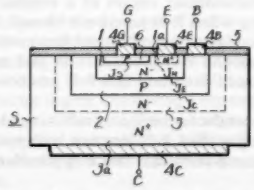
each P-N junction being substantially perpendicular to, and exposed at, the major opposed surfaces of the body.

4,032,956

TRANSISTOR CIRCUIT

Hajime Yagi, Tokyo, and Tadaharu Tsuyuki, Isehara, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 427,647, Dec. 26, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 569,309
Claims priority, application Japan, Dec. 29, 1972, 48-551; May 8, 1974, 49-50871; May 9, 1974, 49-51563
Int. Cl.² H01L 29/00, 29/72, 29/747, 27/02
U.S. Cl. 357—37 10 Claims



1. A semiconductor device adapted for providing controlled amplification, comprising:

a. a first semiconductor region of given concentration and

first conductivity type having a first electrode in contact therewith;

b. a second semiconductor region of a second conductivity type opposite to said first type forming a first PN junction with said first region, said second region having a second electrode in contact therewith;

c. a third semiconductor region of first conductivity type forming a second PN junction with said second region which is spaced from said first PN junction by said second region, said third region having a third electrode in contact therewith;

d. a control semiconductor region of second conductivity type forming a third PN junction with said first region which is spaced from said first PN junction by said first region, said control region having a control electrode attached thereto;

e. means connected to said first, second, and third electrodes for applying voltage potentials to said first, second, and third regions, and to forward bias said first PN junction to permit transporting of majority carriers in said first region to said third region;

f. the distance between said first and third junctions being smaller than the diffusion length of the minority carriers in said first region, a current of minority carriers in said first region injected from said third junction being substantially equal to that from said first junction when no voltage potential is applied to said control electrode; and

g. control voltage means connected to said control electrode for applying a voltage potential to said control region for changing said current of injected minority carriers from said third junction;

whereby the current gain of the device is adjustable by the control voltage means.

4,032,957

SEMICONDUCTOR DEVICE

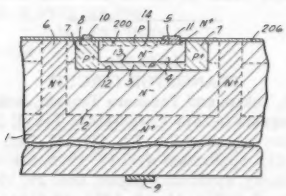
Hajime Yagi, Tokyo, and Tadaharu Tsuyuki, Isehara, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 427,647, Dec. 26, 1973, abandoned. This application Oct. 7, 1975, Ser. No. 620,293

Claims priority, application Japan, Dec. 29, 1972, 48-551; Oct. 31, 1974, 49-125868

Int. Cl.² H01L *29/00, 29/72, 29/747, 27/02*

U.S. Cl. 357—37 **8 Claims**



1. A semiconductor device comprising:

a first semiconductor region of a first conductivity type;

a second semiconductor region of a second conductivity type forming a first P-N junction with said first region;

a third semiconductor region of said first conductivity type forming a second P-N junction with said second region which is spaced from said first P-N junction by said second region;

a fourth semiconductor region of said second conductivity type forming a third P-N junction with said first region which is spaced from said first P-N junction by said first region;

means for biasing said first junction forwardly and transporting the majority carriers in said first region to said third region, said fourth region not being connected to external biasing;

the distance between said first and third junctions being smaller than the diffusion length of minority carriers in said first region; and

the width of said fourth region being selected such that the current of minority carriers in said first region injected from said third junction is substantially equal to that from said first junction.

4,032,958

SEMICONDUCTOR DEVICE

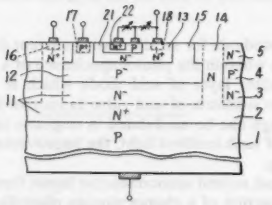
Hajime Yagi, Tokyo, and Tadaharu Tsuyuki, Isehara, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 459,913, April 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 427,647, Dec. 26, 1973, abandoned. This application Oct. 15, 1975, Ser. No. 622,527

Claims priority, application Japan, Dec. 29, 1972, 48-551; Apr. 18, 1973, 48-43881

Int. Cl.² H01L *29/00, 29/747, 27/02, 29/72*

U.S. Cl. 357—37 **5 Claims**



1. A semiconductor device comprising:

a. a first semiconductor region of a first conductivity type;

b. a second semiconductor region of a second conductivity type forming a first PN junction with said first region;

c. a third semiconductor region of said first conductivity type forming a second PN junction with said second region which is spaced from said first junction by said second region;

d. a fourth semiconductor region of said second conductivity type forming a third PN junction with said first region which is spaced from said first PN junction by said first region, the distance between said first and third junctions being smaller than the diffusion length of minority carriers in said first region;

e. means for applying an input signal between said first and second regions and transporting majority carriers in said first region to said third region; and

f. control means connected at least to said fourth region for applying a bias voltage between said first and fourth regions whereby the ratio of current of said majority carriers to input current may be adjusted by changing said bias voltage.

4,032,959

SHIELDED SUPERCONDUCTING INDUCTOR DEVICE

Roger W. Boom; Ronald W. Moses, Jr.; Harold A. Peterson, and Warren C. Young, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Dec. 18, 1974, Ser. No. 533,852

Int. Cl.² H01L *39/08;* **H01F** *27/36;* **H02J** *15/00*

U.S. Cl. 323—44 F **18 Claims**

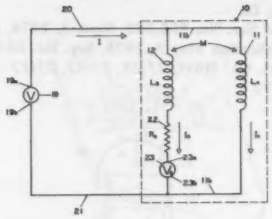
1. A shielded superconducting inductor device comprising:

a. an inductive coil having at least one turn of conductor, said conductor being composed of a superconducting material;

b. a magnetic shield having at least one turn of normal conducting material, said magnetic shield and said inductive coil being electrically connected together in parallel so as to be mutually aiding; and

c. the self inductance of said magnetic shield being substantially equal to the mutual inductance between said mag-

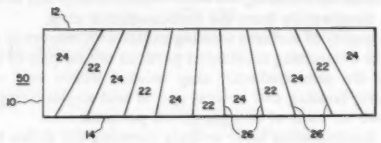
netic shield and said inductive coil, substantially all of the time-varying currents impressed on the shielded superconducting inductor device being conducted by said shield and the time-varying current conducted by said superconducting inductor being substantially zero.

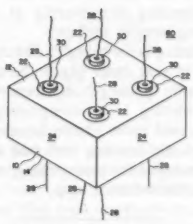


4,032,960
ANISOTROPIC RESISTOR FOR ELECTRICAL FEED THROUGHS

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 30, 1975, Ser. No. 545,482
The portion of the term of this patent subsequent to Sept. 21, 1993, has been disclaimed.
Int. Cl.² H01L 27/02, 29/04
U.S. Cl. 357—51 33 Claims





1. An anisotropic resistor comprising

A body of single crystal semiconductor material having two major opposed surfaces, forming, respectively, the top and bottom surfaces of the body, a first predetermined level of resistivity, a predetermined first type conductivity, a preferred crystal structure and a vertical axis substantially perpendicular to the major opposed surfaces;

at least one of the opposed major surfaces having a predetermined crystal planar orientation which is one selected from the group consisting of (100), (110) and (111);

at least one electrically conductive channel region disposed in the body, extending between, and terminating in, the two major opposed surfaces and having opposed end surfaces coextensive with the respective major surface of the body in which the end surface is disposed;

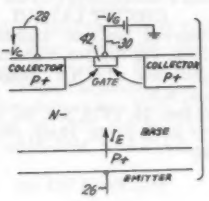
the material of each channel region comprising recrystallized material of the body formed in situ by the migration of a melt of metal-rich semiconductor material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient, established in a predetermined relationship with the opposed major surfaces and the vertical axis of the body, and having the metal of the melt substantially uniformly distributed throughout the entire channel region as an impurity therein, the level of concentration of the metal of the melt in the recrystallized semiconductor region is determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature to import a predetermined second type conductivity and a second predetermined level of resistivity thereto, and

the body and cash channel region functions as an anisotropic resistor feed through when electrical conducting means are affixed to predetermined surface areas of the same.

4,032,961
GATE MODULATED BIPOLAR TRANSISTOR

B. Jayant Baliga, Schenectady; Douglas E. Houston, and Surinder Krishna, both of Ballston Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 515,164, Oct. 16, 1974, Pat. No. 3,979,769. This application Aug. 23, 1976, Ser. No. 716,810
Int. Cl.² H01L 29/66, 29/72, 27/92
U.S. Cl. 357—57 12 Claims



1. A gate modulated bipolar transistor including

an emitter region, at least one collector region, a base region and at least one gate region integral with the base region;

a first region having opposed major surfaces, which are, respectively, the top and bottom surfaces thereof, and a first type conductivity, the first region comprising the base and gate regions;

a second region having opposed major surfaces, which are, respectively, the top and bottom surfaces thereof, and a second and opposite type conductivity, the second region comprising the emitter region;

the top surface of the second region being coextensive with the bottom surface of the first region;

a first P-N junction formed by the contiguous surfaces of the material of the first and second regions of opposite type conductivity;

at least two spaced third regions of second type conductivity disposed in a portion of the top surface of the first region and extending into the first region a distance less than the thickness of the first region, each third region functioning as a collector region and having a top surface coextensive with the top surface of the first region a selected wall surface opposed to a selective wall surface of a mutually adjacent third region thereby defining a gate region therebetween;

a second P-N junction formed by the contiguous surfaces of the material of abutting first and third regions of opposite type conductivity;

the distance between the opposed selective wall surfaces of the spaced collector regions being less than 1.414 times

the depletion layer width of the second P-N junction at breakdown of the device;

a fourth region of first type conductivity disposed in a portion of the top surface of each of the gate regions, each fourth region having a top surface coextensive with the top surface of the third regions and the gate regions and a level of resistivity which is less than that of the gate region;

the width of each fourth region is equal to less than 0.828 times the depletion layer width of the second P-N junction at breakdown;

a plurality of first ohmic electrical contacts, each contact is affixed to one of the fourth regions;

a second ohmic electrical contact affixed to the bottom surface of the second region;

a plurality of third electrical contacts, each contact being affixed to one of the third regions, and wherein

when a variable voltage source, operating between predetermined limits, is connected to the first ohmic electrical contact to drive the gate region and reverse bias is applied to the collector region via the third ohmic electrical contacts, an increase in the gate-collector reverse bias decreases the emitter and collector currents and the transistor functions as a negative resistance element, the magnitude of which is modulated by the variable voltage source.

4,032,962

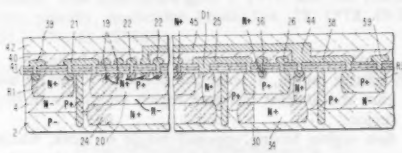
HIGH DENSITY SEMICONDUCTOR INTEGRATED CIRCUIT LAYOUT

John Balyoz, Hopewell Junction; Algirdas Joseph Gruodis, Wappingers Falls; Teh-Sen Jen, Fishkill, and Wadie Faltas Mikhail, Poughkeepsie, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,775

Int. Cl.² H01L *23/48, 29/44, 29/52, 29/60*

U.S. Cl. 357—68 **40 Claims**



1. An integrated circuit formed in a semiconductor body comprising:

a first device including an elongated impurity region and a set of other regions in said elongated region to form a set of diode junctions;

said elongated region being capable of containing a predetermined maximum number of said other regions;

a second device located adjacent the narrow side of said first device;

a first set of conductors disposed above and insulated from said first device by a first layer of electrically insulative material;

said first set of conductors extending over said elongated region orthogonally with respect to the elongated direction;

means interconnecting selected ones of said set of other regions with selected ones of said first set of conductors;

the number of said other regions so interconnected being less than said predetermined maximum number;

at least one other conductor disposed above and insulated from said first set of conductors by a second layer of electrically insulative material;

said other conductor connected to an impurity region of said second device and extending substantially parallel to said elongated direction.

4,032,963

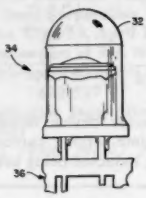
PACKAGE AND METHOD FOR A SEMICONDUCTOR RADIANT ENERGY EMITTING DEVICE

Gene P. Thome, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 502,582, Sept. 3, 1974, abandoned. This application May 5, 1976, Ser. No. 683,552

Int. Cl.² H01L *23/28, 23/02, 23/12*

U.S. Cl. 357—72 **2 Claims**



1. Structure for protecting a semiconductor chip capable of emitting radiant energy comprising:

a. a pair of continuous, separated electrically conducting beam leads each having elongated portions and each terminating at their respective same ends in a pair of chip terminal locations angularly disposed to its respective elongated portion;

b. a semiconductor chip electrically coupled to said pair of chip terminal locations;

c. a solid injection molded outer plastic acrylic or polycarbonate housing material having side, top and bottom surfaces surrounding the semiconductor chip and extending downwardly from the semiconductor chip;

d. a plurality of surfaces forming angles with respect to each other comprising substantial portions of said pair of leads and the semiconductor chip located within said outer plastic housing and at least one of said angles being disposed on each of said elongated portions;

e. an encapsulating layer entirely covering the entire semiconductor chip and all said angular surfaces constituted by portions of said pair of leads and the semiconductor chip and extending downwardly at least to the outer plastic housing bottom surface;

f. said encapsulating layer being in direct contact with internal portions of said outer plastic housing for protecting said outer plastic housing from stress releasing chemicals;

g. said encapsulating layer comprising a material more resilient than said outer plastic housing; and

h. said outer plastic housing and said encapsulating layer comprising material for transmitting radiant energy emitted by the semiconductor chip.

4,032,964

MULTIPLE HYBRID SEMICONDUCTOR STRUCTURE

Karl-Ernst Boeters, Berlin, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Feb. 23, 1976, Ser. No. 660,719

Claims priority, application Germany, Mar. 13, 1975, 2510982

Int. Cl.² H01L *23/02, 23/16*

U.S. Cl. 357—74 **10 Claims**

1. Multiple hybrid semiconductor structure comprising a power semiconductor element (10) and a driver or low-power semiconductor element (11) connected to drive said power element (10);

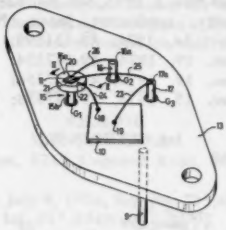
an apertured base plate (13) to which said power semiconductor element (10) is secured

to provide a heat sink and heat dissipating element therefore;

a combination support carrier and electrical terminal (15) comprising a metallic rotation-symmetrical body (15,

15') passing through an aperture of the base plate on which the other of said elements (11) is secured;

and an insulating seal (G_1) mechanically securing and electrically insulating the rotation symmetrical support carrier (15, 15') in, and with respect to the base plate (13) whereby said carrier (15, 15') will directly support the driver semiconductor element (11) and form a terminal post for the structure which is electrically separate from the base plate (13).



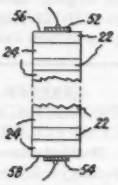
4,032,965
SEMICONDUCTOR VARISTOR EMBODYING A LAMELLAR STRUCTURE

Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 556,740, March 10, 1975, abandoned, which is a continuation of Ser. No. 411,016, Oct. 30, 1973, abandoned. This application Apr. 19, 1976, Ser. No. 678,292

Int. Cl.² H01L *23/32, 29/04, 29/167*

U.S. Cl. 357—76 **20 Claims**



1. A varistor comprising

a body of semiconductor material having two opposed major surfaces forming respectively the top and bottom surfaces of the body, a predetermined level of resistivity, a predetermined first type conductivity, a preferred crystal structure and a vertical axis substantially perpendicular to the major opposed surfaces aligned substantially parallel with a first crystal axis of the semiconductor material of the body;

at least one of the opposed major surfaces having a predetermined crystal planar orientation which is one selected from the group consisting of (100), (110), and (111);

a plurality of spaced planar regions formed in the body, each region consisting of recrystallized semiconductor material of the body having a second and opposite type conductivity and a predetermined level of resistivity and so oriented as to be aligned with a second preferred crystal axis of the material of the body;

each of the spaced planar regions extending between, and terminating in, the opposed major surfaces of the body and oriented substantially perpendicular thereto and having a vertical axis aligned substantially parallel with the vertical axis of the body and the first preferred crystal axis of the material of the body;

the recrystallized material of each spaced planar region is formed in situ by the migration of a melt of metal-rich semiconductor material of the body through the material of the body by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient aligned substantially parallel with the first preferred crystal axis, and the vertical axis of the body and has a predetermined level of concentration of the metal of the melt therein as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration;

the metal includes at least one dopant impurity material to impart the predetermined type conductivity and predetermined level of resistivity to the recrystallized semiconductor material and the metal is distributed substantially uniformly throughout the material of the region;

a P-N junction formed by the abutting, contiguous surfaces of the material of opposite type conductivity of each of the planar regions and that of the body;

each P-N junction being substantially perpendicular to, and exposed at, the major opposed surfaces of the body;

the spaced planar regions and the material of the body between each pair of planar regions defining a lamellar structure of a plurality of integral diodes arranged in a series electrical circuit relationship, and

electrical contact means affixed to selected surface areas of the body to enable a predetermined number of P-N junctions to be biased and cause the integral diode structure defined by the contact means to function as a varistor when electrical potential is applied thereto.

4,032,966
DROP OUT COMPENSATION DEVICE

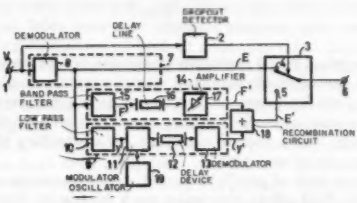
George Churchill Kenney, Briarcliff Manor, N.Y., and Adrianus Huibert Hoogendijk, Eindhoven, Netherlands, assignors to U.S. Philips Corporation and North American Philips Corporation, both of New York, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,251

Claims priority, application Netherlands, May 30, 1975, 7506411

Int. Cl.² H04N *5/76*

U.S. Cl. 358—8 **1 Claim**



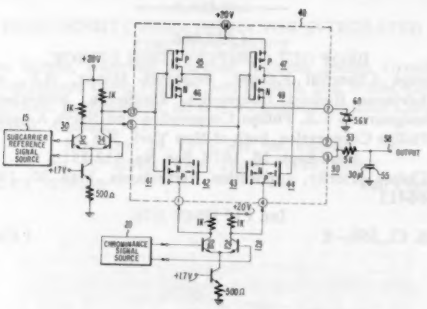
1. A drop-out compensation device for compensating for drop-outs in a modulated color television video signal, comprising a first demodulator having an input terminal connected to the input of said compensation device for converting said video signal into a demodulated composite luminance-chroma signal, a first filter means connected to an output of said first demodulator for separating the chroma from said composite demodulated signal, a first delay line connected to an output of said first filter means for delaying said chroma signal by one television line period, a second delay line connected to the input terminal of the compensation device and to the input of said first demodulator for delaying the modulated color television signal by one television line, a second demodulator connected to an output of said second delay line for demodulating said delayed video signal, second filter means connected to an output of said second demodulator for separating said luminance signal from said delayed modulated video signal, a drop-out detector connected to the input of said compensating device for providing a drop-out detection signal, an output

terminal for said compensation device, and an output summing and switching circuit means connected to the output terminal of said compensation device, to the drop-out detector, to the first demodulator, to said first delay line and to said second filter means for providing the output of said first demodulator to said compensation device output terminal in the absence of a drop-out detection signal and for providing a signal corresponding to the sum of the output signals from said first delay line and said second filter means is response to the presence of a drop-out detection signal.

4,032,967
COMPLEMENTARY FIELD EFFECT TRANSISTOR SIGNAL MULTIPLIER

Leopold Albert Harwood, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 28, 1976, Ser. No. 691,205
Int. Cl.² H04N 9/50; H03K 17/56; H03D 3/18
U.S. Cl. 358—23 **10 Claims**



1. Electrical signal multiplier apparatus comprising:

a first pair of parallel coupled, complementary conductivity field effect transistors each having an input electrode and an output electrode defining a conduction path therebetween, and a control electrode for controlling the conductivity of said path;

a second pair of parallel coupled, complementary conductivity field effect transistors each having an input electrode and an output electrode defining a conduction path therebetween, and a control electrode for controlling the conductivity of said last-named path;

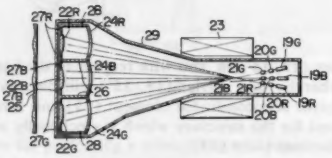
means for applying first and second mutually antiphase alternating input signals to one of said input or control electrodes of said first transistor pair and to one of said input or control electrodes of said second transistor pair, respectively; and

means for applying complementary polarity alternating reference switching signals to the other of said input or control electrodes of said first and second transistor pairs to render said transistor pairs respectively conductive and non-conductive in a complementary manner during alternate switching intervals, whereby output signals are provided alternately at said output electrodes of said first transistor pair and at said output electrodes of said second transistor pair representative of the product of said input and switching signals, said product being substantially free of said switching signals and free of junction offset voltage components.

4,032,968
TELEVISION IMAGE PROJECTING SYSTEM

Keisuke Miyoshi, Katano, and Toshitaka Yukumoto, Ibaragi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 3, 1975, Ser. No. 628,347
Claims priority, application Japan, Nov. 14, 1974, 49-131698; Nov. 14, 1974, 49-131699; Dec. 19, 1974, 49-147353; Dec. 19, 1974, 49-147354; Dec. 19, 1974, 49-147355; Dec. 19, 1974, 49-147356; Dec. 19, 1974, 49-147357; Dec. 19, 1974, 49-147358; Dec. 19, 1974, 49-147359
Int. Cl.² H04N 9/31
U.S. Cl. 358—60 **20 Claims**



1. A television image projecting system comprising a plurality of projector systems and a cathode ray tube, each of said projector systems including:

a phosphor target at one end of said cathode ray tube for displaying a television image thereon,

an electron gun at the other end of said cathode ray tube for radiating an electron beam onto said phosphor target, and

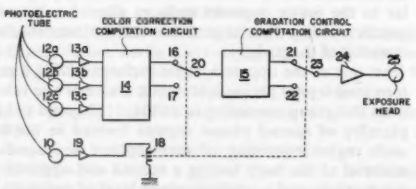
a Schmidt optical system arranged at the rear of said target and having at least a spherical mirror for projecting the television image on said phosphor target onto a screen located at a distance from said television image projecting system,

all of said phosphor targets, electron guns and spherical mirrors of said plurality of projectors being accommodated in said single common cathode ray tube.

4,032,969
SYSTEM FOR REPRODUCING AND RECORDING A PLURALITY OF COLOR ORIGINALS

Sadao Ueda, 193 Hatakeyama-cho, Imadegawa-agaru, Koromodana-dori, Kamigyo, Kyoto, Japan

Continuation-in-part of Ser. No. 527,594, Nov. 27, 1974, abandoned, which is a continuation of Ser. No. 348,216, April 5, 1973, abandoned. This application June 24, 1976, Ser. No. 699,308
Int. Cl.² G03F 3/08
U.S. Cl. 358—80 **6 Claims**



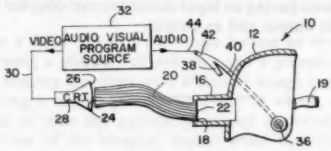
1. A system for reproducing and recording color original pictures by electromechanical and optical scanning comprising a picture scanning device having a scanning field divided into sections, each section being adapted to support an original picture of a group of pictures with the pictures of the group having different characteristics, each original picture of said group being placed into respective sections of the scan-

ning field of the picture scanning device, circuit means for controlling conditions of reproduction, said conditions of reproduction including set values related to the characteristics of said pictures, said circuit means being responsive to respective ones of said sections of said scanning field for setting said conditions of reproduction, and means for controlling said circuit means for changing said set values in synchronism with scanning of said pictures mounted on said sections of said scanning field.

4,032,970
DENTAL MASK

Nina M. Anderson, 5212 Cogswell Road, El Monte, Calif. 91732

Filed July 8, 1976, Ser. No. 703,455
Int. Cl.² H04N 5/64, 5/72
U.S. Cl. 358—93 **1 Claim**

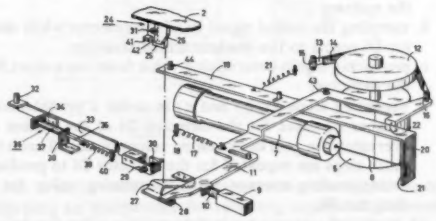


1. A device for occupying the senses of a dental patient during dental work comprising:
- a face mask for covering the eyes of the patient, said face mask having an interior surface positioned to be viewed by the patient;
- a fiber optic image transmission bundle having one end carried by said surface;
- earphones carried by said face mask for covering the ears of the patient; and
- an audio visual program source having an audio signal output part for coupling to said earphones and a picture output surface for coupling to the other end of said fiber optic bundle.

4,032,971
VIDEO PLAYER HAVING SAFETY DEVICES ACTUATED BY UNLATCHING

Eduard Camerik, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,092
Claims priority, application Netherlands, Sept. 11, 1975, 7510688
Int. Cl.² H04N 5/76; G11B 17/00
U.S. Cl. 358—128 **9 Claims**

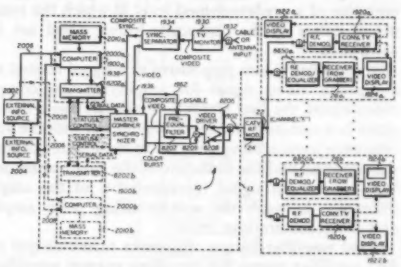


1. A video player for playing back round video disks provided with information tracks which are readable with the aid of a radiation beam, of the type comprising:
- a housing,
- a cover which is movably connected to the housing and in a playing position covers a video disc which is being played,
- latching means for latching the cover in its playing position,
- unlatching means for unlatching the cover from its playing position,
- a main motor accommodated in the housing for rotating the video disk,
- a drive spindle coupled to the main motor for the rotary support of a video disk, and
- a radiation source for producing said radiation beam,
- first switching means for switching off the main motor,
- brake means for braking and bringing the drive spindle to a standstill,
- second switching means for extinguishing the radiation beam,
- guard means which enter the path of the radiation beam for masking off the radiation beam before it can emerge from the housing and wherein said unlatching means is operatively coupled to at least one of said first and second switching means, said brake means and said guard means.

4,032,972
PIGGY BACK ROW GRABBING SYSTEM

Richard Saylor, Monsey, N.Y., assignor to IDR, Inc., Farmingdale, N.Y.

Filed June 23, 1976, Ser. No. 699,088
Int. Cl.² H04N 5/22, 7/18
U.S. Cl. 358—142 **24 Claims**



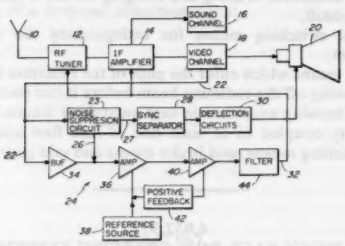
1. A common channel video communication system for providing a television field comprising a plurality of television video scan lines over said common channel, said television field being comprised of both at least one video displayable row of video data characters contained in a pseudo video scan line occupying one of said plurality of television video scan lines and normal television video displayable information occupying the balance of said plurality of television video scan lines; said system comprising means for providing said television video scan lines comprising said normal television video information; means for providing said pseudo video scan line; and means operatively connected to said normal television video information providing means and said pseudo video scan line providing means for combining said normal television video information television video scan lines and said pseudo video scan line for providing said television field over said common channel, said pseudo video scan line providing means comprising means for providing said pseudo video scan line having a television video scan line format and capable of comprising a complete self-contained packet of digital information sufficient to provide said one row as an entire displayable row of video data characters, said displayable one row comprising a plurality of television video scan lines, said pseudo video scan line having an associated transmission time equivalent to said television video scan line, said packet of digital information comprising at least address information for said displayable one row and data information for said displayable characters in said displayable one row, said displayable one row being capable of providing a continuous video display of a selectable grabbed row of video information comprising said video data characters on a video display means from continuously transmittable video information.

4,032,973

POSITIVE FEEDBACK HIGH GAIN AGC AMPLIFIER

William P. Haynes, Bedford, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed May 7, 1976, Ser. No. 684,209
Int. Cl.² H04N 5/56; H03F 3/68
U.S. Cl. 358—176 **5 Claims**



1. In a television receiver having a gain controlled signal receiver for providing a composite video signal, an automatic gain control circuit for providing a gain control signal to the signal receiver comprising:

a. a voltage reference source for providing a voltage representative of a predetermined level at which the synchronizing pulses of the composite video signal are to be controlled,

b. first amplifier means responsive to a signal related to the composite video signal for amplifying the composite video signal, the first amplifier means having a first transistor in a common emitter configuration with the voltage reference source being coupled to the emitter of the first transistor so that the collector of the first transistor provides an output signal representative of the amplified difference between the synchronizing pulse amplitude and the predetermined level,

c. second amplifier means responsive to the output of the first amplifier means for providing current amplification of the composite video signal, the second amplifier means having a second transistor in an emitter follower configuration,

d. positive feedback means for coupling a portion of the output of the second transistor to the first amplifier to establish a virtual ground at the emitter of the first transistor, and

e. filter means connected to the output of the second amplifier means to produce the gain control signal.

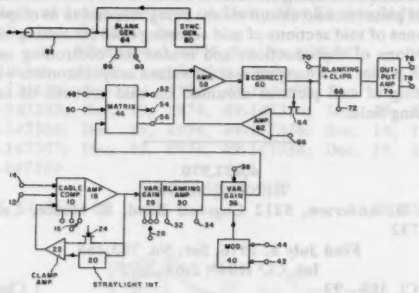
4,032,974

VIDEO PROCESSING CIRCUIT

Frederik Johannes Van Roessel, Upper Saddle River, N.J., assignor to North American Philips Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,591
Int. Cl.² H04N 5/38, 5/04, 5/14
U.S. Cl. 358—186 **7 Claims**

1. A video processing circuit comprising a cable compensating circuit having a first input means for receiving a video signal, a second input means, and an output, a straylight compensation and clamping circuit having an input coupled to said cable compensation circuit output and an output coupled to said cable compensation circuit second input means, a blanking amplifier having an input direct current coupled to said cable compensating circuit output and an output, a matrix circuit having an input direct current coupled to said blanking amplifier output and an ouput, and a gamma correction and



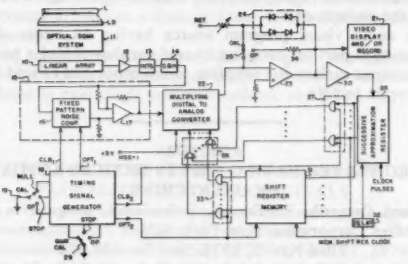
clamping circuit having an input direct current coupled to said matrix circuit output and an output.

4,032,975

DETECTOR ARRAY GAIN COMPENSATION

Richard M. Malueg, Glendora, and Michael J. Meier, Monrovia, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Feb. 25, 1974, Ser. No. 445,787
Int. Cl.² H04N 3/14, 5/30
U.S. Cl. 358—213 **19 Claims**



14. A method for normalizing the gain utilized with a detector Di in a detector system employing a plurality of detectors, comprising the steps of:

a. applying a predetermined stimulus Pi to a detector Di of the system;

b. sampling the output signal Bi of the detector while detector Di reacts to the predetermined stimulus;

c. producing a gain determining value from the output Bi of the detector;

d. repeating steps a), b) and c) in order a predetermined number of times for the detector Di of the system and averaging the gain determining values obtained each time those steps are repeated for the detector Di to produce a corresponding average gain determining value for the detector Di;

e). storing the average gain determining value for detector Di;

f). applying a stimulus Ui of unknown magnitude to the detector to produce an output signal Si;

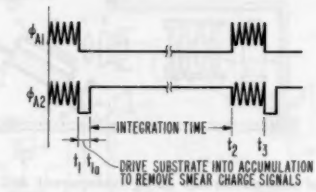
g). recalling the stored average gain determining value for detector Di; and

h). producing a normalized output Si' for detector Di from the recalled gain determining value and the output signal Si.

4,032,976
SMEAR REDUCTION IN CCD IMAGERS

Peter Alan Levine, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 16, 1976, Ser. No. 677,755
Int. Cl.² H04N 3/14; H01L 29/78, 31/00
U.S. Cl. 358—213 3 Claims



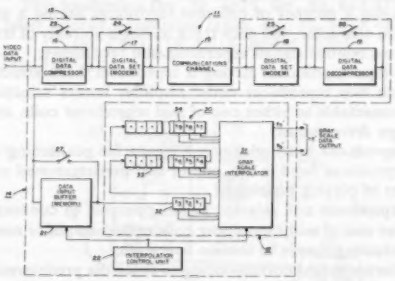
1. In a CCD imager of the type having an imaging region comprising a plurality of columns and a plurality of rows of image sensing locations onto which an image is projected for producing a charge pattern field and in which, after a fixed interval of time the pattern produced is periodically transferred out of the imaging region while the image remains projected thereon, whereby smear charge signals are produced during such transfer, and wherein each transferred pattern is subsequently read-out during a field time, a method for substantially reducing the effect of the smear charge signals comprising the step of:

unconditionally removing the smear charge signals remaining in the imaging region, only once each field time, after each transfer of a charge pattern field out of the imaging region and just prior to the production of the next charge pattern field, during a fixed period which is only a small fixed fraction of said fixed interval of time and whose duration is independent of the image intensity.

4,032,977
GRAY SCALE INTERPOLATION TECHNIQUE

Henry H. J. Liao, Carrollton, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed June 3, 1976, Ser. No. 692,604
Int. Cl.² H04N 1/40
U.S. Cl. 358—280 26 Claims



1. In a raster scanned imaging system, the improvement comprising an interpolator for receiving expanded gray scale information from quantized data elements of a video input signal, said interpolator including

multi-stage register means having outputs taken from predetermined stages to define a $m \times n$ prediction matrix,

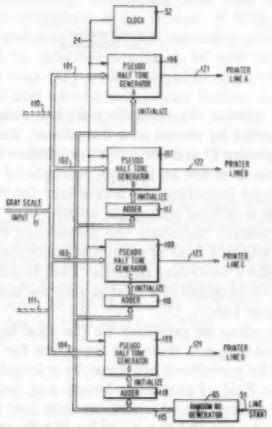
means for serially propogating the data elements of said input signal through the stages of said register means, whereby successive patterns of video input data elements are sequentially entered into said prediction matrix, and

interpolation means coupled to the output of said register means for sequentially predicting gray scale values for successive video output data elements in response to said matrix patterns, the prediction matrix for each of said video output data elements including a spatially corresponding input data element along with vertically and horizontally adjacent input data elements.

4,032,978
PSEUDO HALFTONE PRINT GENERATOR AND METHOD

Kwan Y. Wong, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,530
Int. Cl.² H04N 1/40, 1/22
U.S. Cl. 358—283 14 Claims



1. Apparatus for generation of pseudo halftone spot patterns for series of print positions, each series forming a print line, for adjacent groups of N said print lines to form ($N \times N$) matrices of print positions, said spot patterns being generated in accordance with pre-established gray scale levels, each of said gray scale levels representing an area greater than one print position, comprising:

an input means including means for supplying said pre-established gray scale levels in digital form sequentially at a repetition rate lower than the incrementing rate of the counting means;

an output;

counting means for incrementing a count by a preselected number N for each print position, said counting means recycling when the count exceeds the square of said number minus 1;

initialization means for initializing the count of said counting means at the beginning of each said print line, said initialization means including a random number generator for selecting said initialization count in digtital form for one of said N print lines and for separately supplying said selected initialization count for each of the remainder of said N print lines, each differing from said selected count by a different predetermined value; and

comparator means connected to said input means and to said counting means for comparing said gray scale level to said count for each said print position and providing a print signal therefor at said output upon said level exceeding said count.

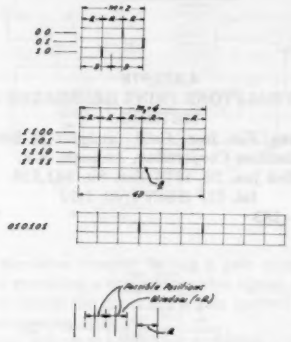
4,032,979
METHOD AND SYSTEM FOR ENCODING AND DECODING DIGITAL DATA

Stephen E. Rice, Del Mar, Calif., assignor to Digital Development Corporation, San Diego, Calif.

Continuation of Ser. No. 318,587, Dec. 26, 1972, abandoned. This application Dec. 27, 1974, Ser. No. 537,121

Int. Cl.² G11B *5/09*

U.S. Cl. 360—40 **20 Claims**



1. In a system for recording digital data on a magnetic storage carrier by means of a transducer, and on a track at a data bit spacing D and for a read resolution R smaller than D but wherein D is not an integral multiple of R, comprising:

first means including the transducer for recording *m* data bits in a field of particular length;

second means including the transducer for recording 2*m* data bits in a field of twice the particular length whereby boundary recording of either field is different from mid-field recordation of a field having the length for recording 2*m* data bits;

the recording as provided by the first and second means establishing less than one transition for each data bit, so that the transitions are apart by a length larger than 1/*m* of the field of particular length and positions for transitions being spaced apart, so that less than 2^m and 2^{2m} different possibilities exist for placing transitions for recording of respectively *m* and 2*m* data bits;

third means connected to the first and second means and providing to them a train of bi-valued data bits; and

fourth means connected for operating the first and second means in response to combinations of bit values of *m* data bits, so that for a plurality of different bit value combinations, less than 2^m, the first means is operated, and for at least one other bit value combination of the first *m* of 2*m* data bits, 2*m* data bits are recorded in one of 2^m different patterns.

4,032,980
RECORDED MAGNETIC MEMBER VIEWING APPARATUS

Werner E. L. Haas, Webster, and Gary A. Dir, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 2, 1976, Ser. No. 702,269

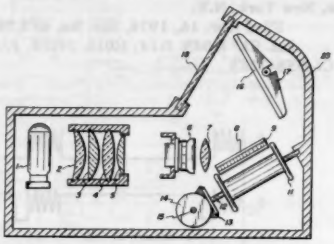
Int. Cl.² G11B *5/02*; **G05D** *25/00*; **G03B** *21/00*

U.S. Cl. 360—56 **11 Claims**

1. Latent magnetic image viewing apparatus, comprising:

a. means for advancing a magnetizable member bearing a latent magnetic image into a detection station; and

b. at said detection station a magneto-optic cell comprising between two magnetic field permeable substrates, a composition comprising ferrofluid and metal flakes, at least



one of said substrates being transparent and providing optical access to said composition.

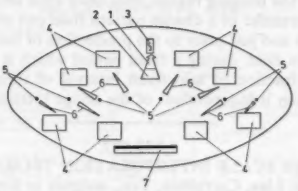
4,032,981
MULTIPLE SELECTION SOUND REPRODUCING APPARATUS

Victor Victoriano Arguelles, Rio de Janeiro, Brazil, assignor to Pevi Aparelhos S.A., Sao Paulo, Brazil

Filed Oct. 17, 1975, Ser. No. 623,298

Int. Cl.² G11B *15/02*, *15/18*, *21/08*; **H04M** *17/02*

U.S. Cl. 360—69 **8 Claims**



1. A multiple selection sound reproducing apparatus comprising in combination:

a. a multichannel endless tape having a predetermined number of channels, each having two tracks, each track having a number of different recordings having a common character, and each track having a plurality of transverse control signals separating said recordings,

b. a tape reproducer having a reproducer head structure with two reproducer coils, amplifier means selectively connectable to either one of said reproducer coils, and a tape drive means;

c. reproducer head positioning means for positioning said reproducer head in any one of said predetermined number of playing positions;

d. reproducer coil selector means operable to connect either one of said reproducer coils to said amplifier means;

e. actuating means to initiate operation;

f. selector means corresponding to twice the predetermined number of channels on said tape, said selector means made operable by said actuating means, actuation of each of said selector means operates said reproducer head positioning means to position said head in a particular one of said predetermined number of playing positions and operates said reproducer coil selector means to connect a particular one of said reproducer coils to said amplifier means;

g. detector means to detect said control signals; and

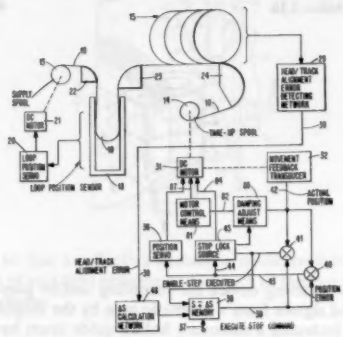
h. disconnection means to disconnect said motor drive means on detection of a control signal by said detector means.

4,032,982

ADAPTIVE VOLTAGE CONTROL OF MOTOR IN AN INCREMENTING MAGNETIC TAPE TRANSPORT

Nelson K. Arter, and Howard C. Jackson, both of Longmont, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,131
Int. Cl.[2] G11B *15/32, 15/58, 15/20*
U.S. Cl. 360—74 16 Claims



13. A servomechanical system including in combination a motor having an output shaft;

a movement feedback transducer operably associated with said shaft for providing signals indicative of movements of said shaft;

control means operably associated with said feedback transducer to generate a signal indicating motor overshoot and/or motor undershoot;

control means to receive the overshoot and/or undershoot signal and outputting a signal when the overshoot and/or undershoot signal is equal to or greater than a threshold value; and

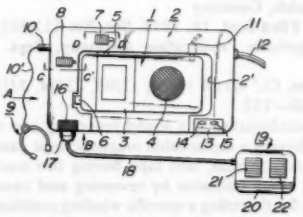
means for adjusting the voltage driving the motor when the overshoot and/or undershoot is outside of the threshold value so as to minimize ringing.

4,032,983

ADAPTER FOR USE IN TRANSCRIBERS

Masaaki Sato, No. 13, Terada-Cho, Hachioji, Tokyo, Japan

Continuation of Ser. No. 459,365, April 9, 1974, abandoned.
This application Dec. 30, 1975, Ser. No. 645,471
Claims priority, application Japan, Apr. 10, 1973, 48-40983
Int. Cl.[2] G11B *15/18;* H04M *11/00*
U.S. Cl. 360—69 6 Claims



1. An adapter for a self-contained tape recorder for transcribing recorded intelligence, the adapter coacting with the tape recorder to be used conveniently as a transcriber, the tape recorder being provided with a first play button and a first review-cue button, the adapter comprising, in combination:

a casing having an upper surface, said upper surface being formed with a depressed portion detachably enclosing the tape recorder, said casing having a second play button and a second review-cue button and a power supply energized by an external power source; an exteriorly operable first slide button slidably mounted on the adapter; a main switch connecting said power supply and said external power source, a play switch operatively connected to said power supply, and a channel-shaped elastic block, said first play button being operatively connected through said elastic block to said first slide button; a detachably connected foot switch, a cord having a plug connecting said foot switch, into the adapter, said foot switch being provided with a play pedal and a review-cue pedal, said second play button and said play pedal being operatively connected to said play switch, said play switch having ON and OFF positions, said play switch occupying the ON position upon selective actuation of the play button and the play pedal, said play switch occupying the OFF position upon selective release of said second play button and said play pedal;

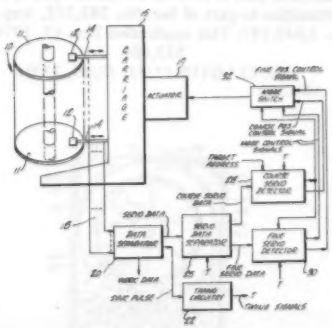
two solenoids enclosed in the adapter, and two actuation switches connected to said solenoids, respectively, each actuation switch being connected to said play switch, said solenoids operatively contacting said first review-cue button when energized upon closure of both the main switch, and said play switch upon operating said first slide button, and by selective actuation of said second play button, and said play pedal, respectively, and selective actuation of said second review-cue button, and of said second review-cue pedal, respectively.

4,032,984

TRANSDUCER POSITIONING SYSTEM FOR PROVIDING BOTH COARSE AND FINE POSITIONING

Jon Bruce Kaser, Thousand Oaks; John Lawrence Von Feldt, Simi Valley, and Ivan Earl Walenta, Westlake Village, all of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed Apr. 28, 1975, Ser. No. 572,304
Int. Cl.[2] G11B *21/10, 5/82*
U.S. Cl. 360—77 23 Claims



21. A servo system for positioning a transducer means relative to a group of at least three tracks provided on a relatively moving recording medium, said system comprising:

positioning means for moving said transducer means transversely relative to said tracks;

a plurality of servo data manifestations recorded in each track comprising a like located reference manifestation and spaced fine servo data manifestations and coarse servo data manifestations precisely located relative to said reference manifestation, said coarse servo data manifestations being recorded in each track so as to constitute a plurality of adjacent cells each having either a first or second value, the cells being respectively aligned for all tracks of each group and being encoded so as to provide:

a. a different identifying representation for each track of

a group so that each track of the group is identifiable from the coding provided for its respective plurality of adjacent cells; and

b. an encoding sequence chosen for each group of tracks so that the value of only one cell is different on adjacent tracks, said fine servo data manifestations being recorded in each track so that traversal thereof by said transducer means produces detected signals indicative of the positioning of said transducer relative to two adjacent tracks;

first detecting means responsive to the detection by said transducer means of the differently encoded coarse servo data manifestations provided in each track of said group of tracks for controlling said positioning means to provide for coarse positioning of said transducer means to a target track position; and

second detecting means responsive to the detection by said transducer means of said fine servo data manifestations and operable upon completion of the coarse positioning of said transducer means by said first detecting means for controlling said positioning means so as to bring and maintain said transducer means in alignment with said target track position.

4,032,985

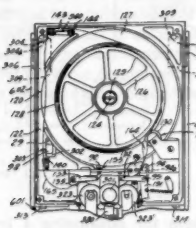
VIDEO TRANSDUCER SYSTEM AND METHOD WITH TAPE DRAG BETWEEN THE REEL AND THE CAPSTAN

Marvin Camras, Glencoe, Ill., assignor to IIT Research Institute, Chicago, Ill.

Continuation-in-part of Ser. No. 346,869, April 2, 1973, which is a continuation-in-part of Ser. No. 282,275, Aug. 21, 1972, Pat. No. 3,849,797. This application Dec. 17, 1974, Ser. No. 533,485

Int. Cl.² G11B *15/43*, *15/60*, *23/04*

U.S. Cl. 360—93 **9 Claims**



1. In an endless loop cartridge transducer system including a capstan drive for pulling tape along the incoming tape path extending from an inner side of a coil of record tape to the capstan drive and for supplying tape to the outer side of said coil along an outgoing tape path extending from the capstan drive and establishing a relatively isolated tape loop adjacent the capstan drive where the tape motion is relatively steady, a transducer head for scanning cooperation with the record tape at said isolated tape loop, and a tape drag for applying a substantial drag force to the tape at said incoming tape path so as to produce a substantial tape tension at the input side of said capstan drive prior to engagement of the tape with said drive.

4,032,986

SCANNING DEVICE FOR THE RECORDING AND/OR PLAY-BACK OF WIDE-BAND SIGNALS

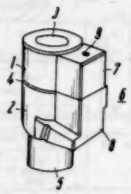
Rudolf Prochnow, Darmstadt-Eberstadt, Germany, assignor to Robert Bosch Fernsehanlagen G.m.b.H., Darmstadt, Germany

Filed Mar. 22, 1976, Ser. No. 669,346

Claims priority, application Germany, Mar. 26, 1975, 2513326

Int. Cl.² G11B *15/60*

U.S. Cl. 360—130 **4 Claims**



1. In a scanning device for recording and/or play-back of wide-band signals from a magnetic tape by the diagonal track method, including a stationary hollow guide drum having two parts spaced apart to define a slot, said drum adapted to receive a magnetic tape engaging less than 360° of the periphery thereof, and a head-wheel carrying at least two magnetic heads and disposed in said drum for the rotation of the magnetic heads transversally to said slot for scanning said magnetic tape which is moved diagonally across said slot, the improvement comprising:

a guide drum holder means having two parts for retaining said two parts of said guide drum in a predetermined alignment;

means fixedly attaching each part of said holer means to a respective part of said guide drum; and

connecting means detachably connecting the parts of said holder means to each other; whereby said holder mans can be disconnected and then connected and the parts of said guide drum will be substantially in the predetermined alignment.

4,032,987

SOUND RECORDING AND REPRODUCING APPARATUS USING A CASSETTE HAVING A CASING MADE OF REFLECTIVE MATERIAL

Franz Singer, Munich; Paul Fahlenberg, Baierbrunn, and Rudolf Lang, Grafing Bhf., all of Germany, assignors to Compur-Werk Gesellschaft mit beschrankter Haftung & Co., Munich, Germany

Filed Sept. 16, 1975, Ser. No. 613,861

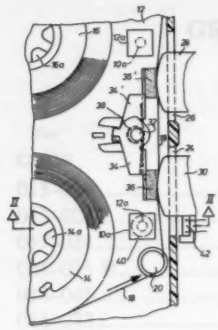
Claims priority, application Germany, Sept. 25, 1974, 2445751

Int. Cl.² G11B *15/18*, *15/08*, *23/04*, *23/34*

U.S. Cl. 360—132 **8 Claims**

1. The combination of a sound recording and reproducing apparatus having a replaceable magnetic tape cassette having rotatable reels therein, said tape having two tracks thereon, each track being utilizable by reversing said cassette, detection means for detecting a specific winding position of the tape using a light utilizing unit which is installed in the apparatus, said light utilizing unit comprising a light emitting means and a light receiving means, said light emitting means being located on one side of said cassette to transmit light in a direction transverse to a plane perpendicular to the axes of rotation of said reels, the casing of said cassette being made of a reflective material, said casing having first and second projections each provided with at least one reflecting surface for reflecting the light beam from said light emitting means to said light receiving means in response to a monitoring of the position of

the tape and said first and second projections with their reflecting surfaces being arranged in the cassette casing in symmetrical disposition relative to the reversing plane of the



cassette so that a reflecting surface is made available to the elements of said light utilizing unit in each of the two positions of the cassette.

4,032,988

COMPRESSED GAS FILLED CIRCUIT BREAKER

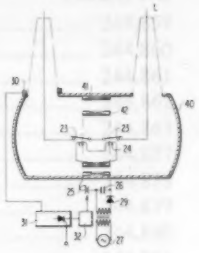
Nobuaki Kiyokuni, Kawasaki, Japan, assignor to Fuji Electric Company Ltd., Kawasaki, Japan

Filed Jan. 30, 1976, Ser. No. 653,866

Int. Cl.² H02H *3/00*

U.S. Cl. 361—115 **2 Claims**

1. A circuit breaker of the type having a high potential side and a ground side, at least one contact having a movable contact element, at least one corresponding driving coil disposed in the vicinity of said movable contact element, a capacitor for supplying a current to said at least one driving coil by discharging the energy stored therein to drive said movable contact element by an electromagnetic repulsive force acting between said movable contact element and said driving coil, to thereby open said contact, the improvement comprising



said capacitor being disposed on said ground side, a transformer having a primary coil disposed on the ground side and connected to said capacitor, and a secondary coil disposed on the high potential side and connected to said driving coil and electromagnetically coupled to said primary coil, said contact, driving coil, primary and secondary coils being located inside a grounded tank filled with a compressed gas having arc suppression properties.

DESIGN PATENTS

GRANTED JUNE 28, 1977

ERRATA

For CLASS	See PATENT NO.
013–024	244,859
013–024	244,860
013–024	244,861
064–011 B	244,862
014–045	244,863
014–073	244,877
024–099	244,878
024–029	244,879
029–008	244,880
028–037	244,881
028–018	244,882

DESIGN PATENTS

GRANTED JUNE 28, 1977

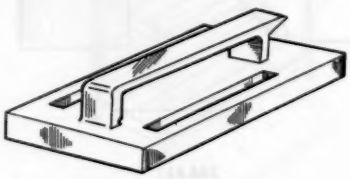
ERRATA

DESIGNS

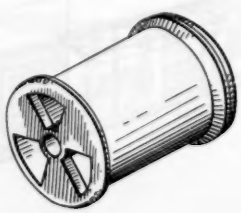
JUNE 28, 1977

244,806
SHOE PULLER
Barbara Pryor, 2829 W. Lunt, Chicago, Ill. 60645
Filed Dec. 18, 1975, Ser. No. 641,831
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D2—378.2

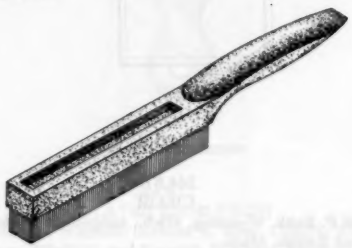
244,807
UNDERWATER BELT AND HOSE CLIP
Thomas J. Bardoni, 459 Poplar, Wyandotte, Mich. 48192, and William Markarian, 5970 Weddel, Taylor, Mich. 48180
Filed July 7, 1975, Ser. No. 593,772
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400



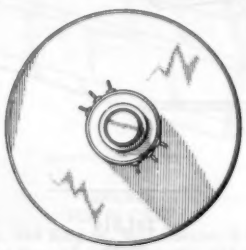
244,808
PLASTIC SPOOL FOR THREAD OR THE LIKE
Ernest F. Ubermuth, Watertown, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.
Filed Dec. 15, 1975, Ser. No. 640,544
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D3—19 A



244,809
BRUSH
Joseph A. Graham; Reginal M. Stephenson, and Donald D. Dewar, all of Winnipeg, Canada, assignors to Atlas-Graham Industries Company Ltd., Winnipeg, Canada
Filed Sept. 9, 1975, Ser. No. 611,718
Claims priority, application Canada, July 16, 1975, 160775
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—31



244,810
JEWELRY CADDY
Chad W. Patterson, 619 Twenty-Eighth St., Ogden, Utah 84403
Filed Jan. 12, 1976, Ser. No. 648,183
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—28

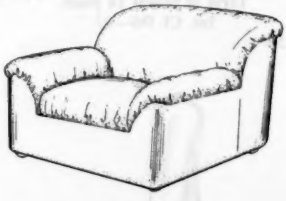


244,811
CHAIR
Jonathan Samuel Sternfield, 247 W. 16th St., New York, N.Y. 10011
Filed July 10, 1975, Ser. No. 594,776
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

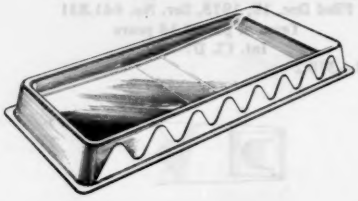
244,812
CHAIR
Randall P. Buhk, Wyoming, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.
Filed Sept. 5, 1975, Ser. No. 610,839
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

244,813
CHAIR
Randall P. Buhk, Wyoming, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.
Filed Sept. 5, 1975, Ser. No. 610,841
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

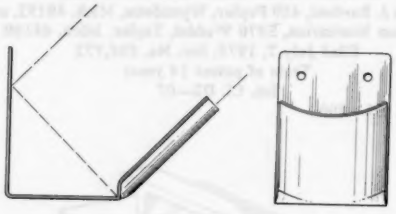
244,814
SEAT
Svante Schoblom, Tranas, Sweden, assignor to Overman AB, Tranas, Sweden
Filed Oct. 15, 1975, Ser. No. 622,511
Claims priority, application Sweden, Apr. 17, 1975, 7500081
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



244,815
COT
Bill D. Snow, 3817 Rutledge, Fort Worth, Tex. 76107
Filed Dec. 22, 1975, Ser. No. 643,361
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—79

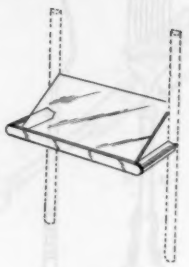


244,816
HOLDER FOR CYLINDRICAL CONTAINER
Charles William Pierce, Hurricane Harbour, Marathon, Fla. 33050
Filed Dec. 17, 1976, Ser. No. 751,812
Term of patent 3.5 years
Int. Cl. D6—*04*
U.S. Cl. D6—114



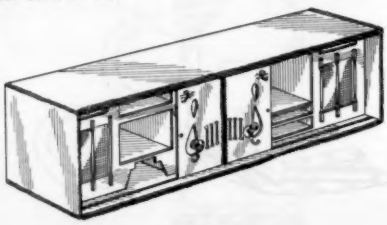
244,817
SHELF FOR A WALL SYSTEM
Janet Schweitzer, New York, N.Y., assignor to The Pace Collection, Inc., New York, N.Y.
Division of Ser. No. 654,537, Feb. 2, 1976, Pat. No. Des. 242,513, which is a division of Ser. No. 436,487, Jan. 25, 1974, Pat. No. Des. 239,225. This application May 14, 1976, Ser. No. 689,351
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—132

244,818
SHELF FOR A WALL SYSTEM
Janet Schweitzer, New York, N.Y., assignor to The Pace Collection, Inc., New York, N.Y.
Division of Ser. No. 654,537, Feb. 2, 1976, Pat. No. Des. 242,513, which is a division of Ser. No. 436,487, Jan. 25, 1974, Pat. No. Des. 239,225. This application May 14, 1976, Ser. No. 690,606
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—132

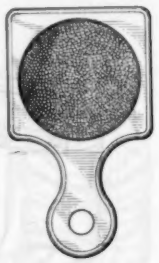


244,819
GREENHOUSE POTTING BENCH
Louis J. Christen, Jr., St. Louis, Mo., assignor to Christen Incorporated, St. Louis, Mo.
Filed Oct. 31, 1975, Ser. No. 627,511
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179

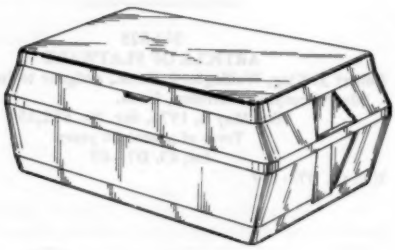
244,820
COMBINED TV, STEREO AND ACCESSORY CABINET
Leroy C. Freeman, 5964 Streamview Drive, San Diego, Calif. 92105
Filed Oct. 24, 1975, Ser. No. 625,589
Term of patent 7 years
Int. Cl. D6—*05*
U.S. Cl. D6—186



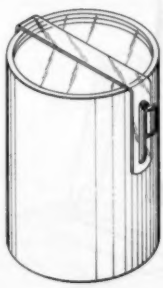
244,821
COASTER
Julie Pomerantz, 230 Fifth Ave., New York, N.Y. 10001
Filed June 30, 1975, Ser. No. 591,599
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—45



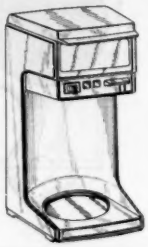
244,822
INSULATED FOOD CHEST
John E. Havely, Winfield; Kenton A. Buss, Oxford; Tony E. Branscum, Winfield, and Kenneth D. Lewis, Winfield, all of Kans., assignors to Gott Mfg. Co., Inc.
Filed Sept. 22, 1975, Ser. No. 615,781
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—77



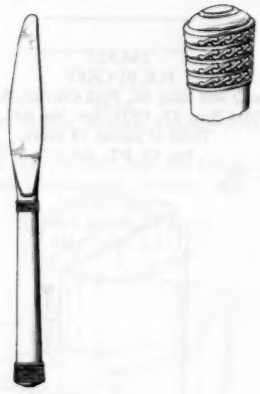
244,823
ICE BUCKET
Abram L. Lass, 980 King St., Port Chester, N.Y. 10573
Filed Nov. 17, 1975, Ser. No. 632,192
Term of patent 14 years
Int. Cl. D7—*01, 07*
U.S. Cl. D7—78



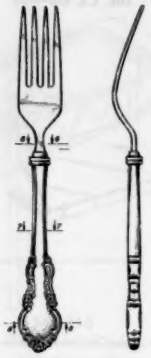
244,824
COFFEEMAKER WATER DISPENSER
Bernard B. Bluestein, Des Plaines, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Apr. 21, 1975, Ser. No. 570,334
Term of patent 14 years
Int. Cl. D7—*02;* D15—*08*
U.S. Cl. D7—85



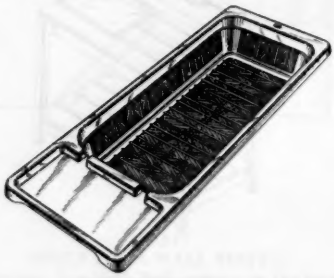
244,825
ARTICLE OF FLATWARE
Robert J. King, Wallingford, Conn., assignor to International Silver Company, Meriden, Conn.
Filed May 3, 1976, Ser. No. 682,357
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



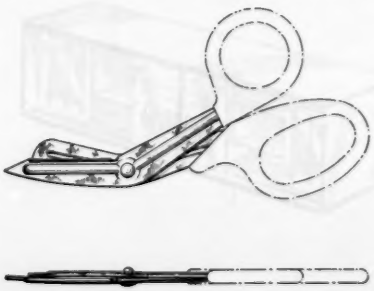
244,826
ARTICLE OF FLATWARE
Robert J. King, Wallingford, Conn., assignor to International Silver Company, Meriden, Conn.
Filed May 3, 1976, Ser. No. 682,358
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



244,827
CLEANING AND DRAINING DEVICE
Bela B. Nevai, Dobbs Ferry, N.Y., assignor to Belaco International Ltd., Dobbs Ferry, N.Y.
Filed Feb. 5, 1976, Ser. No. 655,404
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—188

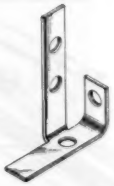


244,828
BLADE ASSEMBLY FOR CUTTING SHEARS
Luigi P. Visco, 4 Paugussett Road, Sandy Hook, Conn. 06482
Filed Sept. 2, 1975, Ser. No. 609,546
Term of patent 14 years
Int. Cl. D8—*01*
U.S. Cl. D8—5

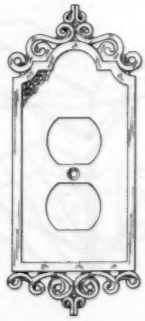


244,829
ELECTRONIC TORQUE WRENCH
Kenneth A. Lehoczky, Livonia, and Thomas C. Rigdon, Plymouth, both of Mich., assignors to GSE, Inc.
Filed June 4, 1976, Ser. No. 693,222
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—24

244,830
STOP FOR WINDOWS, DOORS AND THE LIKE
Richard F. Tulak, 274 E. Verdugo Ave., Burbank, Calif. 91502
Filed Mar. 29, 1976, Ser. No. 671,322
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—402

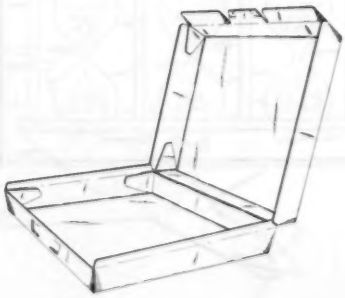


244,831
WALL PLATE
Joan Grieb, New York, N.Y., assignor to General Electric Company, N.Y.
Filed Oct. 20, 1975, Ser. No. 624,193
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—350

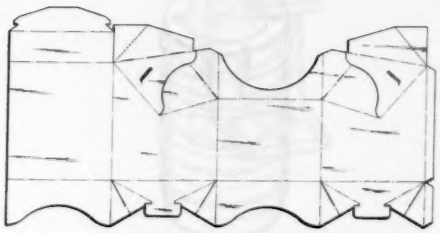


244,832
BARREL
Howard Bryan Carter, Sharon, Canada, assignor to Rosedale Plastics (Containers) Limited
Filed Dec. 1, 1975, Ser. No. 636,814
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—170

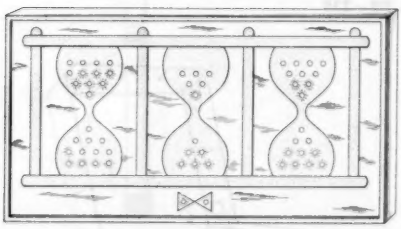
244,833
FOLDING CARTON
Karl Rune Persson, Halmstad, Sweden, assignor to Duni-Bila AB, Halmstad, Sweden
Filed Nov. 5, 1975, Ser. No. 629,041
Claims priority, application Sweden, May 5, 1975, 75958
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—235



244,834
CARTON BLANK
Wallace E. Hanson, Hampden, Mass., assignor to Champion International Corporation, Stamford, Conn.
Filed Nov. 19, 1975, Ser. No. 633,229
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—245

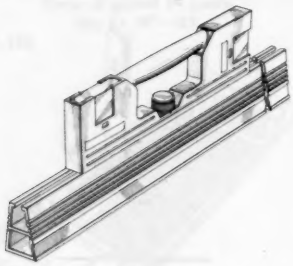


244,835
ELECTRONIC HOUR GLASS CLOCK
Harshadrai D. Sheth, 32522 Jaclynn Drive, Union City, Calif. 94587
Filed Feb. 9, 1976, Ser. No. 656,821
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15

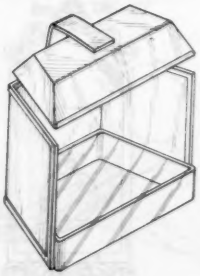


244,836
SINE WAVE TEMPLATE
Bruce H. Stockton, 4665 Moorhead Ave., Boulder, Colo. 80302
Filed Apr. 12, 1976, Ser. No. 676,225
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64

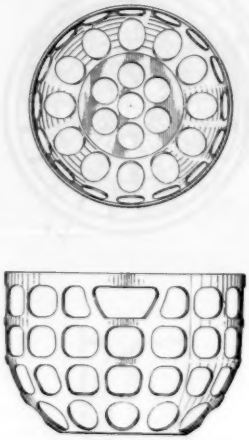
244,837
LEVEL
Hans Kristian Thingstad, and Horst Jürgensen, both of Sodertalje, Sweden, assignors to Libella Tool AB
Filed Apr. 17, 1975, Ser. No. 569,073
Claims priority, application Sweden, Nov. 8, 1974, 741843
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—69



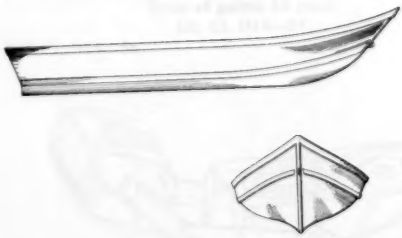
244,838
COMBINED PLANTER AND LIGHT FIXTURE TO BE USED IN FIREPLACES OR THE LIKE
Frank L. LeBreux, 257 Arbor Lane, Bloomingdale, Ill. 60108
Filed Nov. 17, 1975, Ser. No. 632,739
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—144



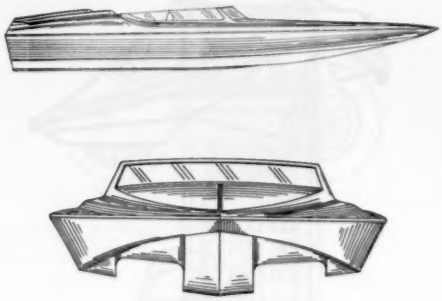
244,839
PLANT BALLING DEVICE
Robert S. Malkin, 257 Park Ave. South, New York, N.Y. 10010
Division of Ser. No. 470,627, April 16, 1975, Pat. No. Des. 239,128. This application Aug. 26, 1975, Ser. No. 622,787
Term of patent 14 years
Int. Cl. D15—*03, 99*
U.S. Cl. D11—148



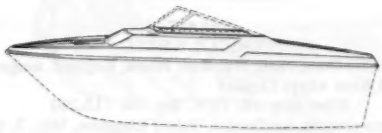
244,840
BOAT
Wilton Stokes, 750 Burch Ave., Winter Garden, Fla. 32787
Filed Oct. 20, 1975, Ser. No. 623,725
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



244,841
TUNNEL HULL POWER BOAT
Bruce E. Nescher, 1861 Kashlon, La Habra Heights, Calif. 90631
Filed Apr. 30, 1976, Ser. No. 681,787
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62

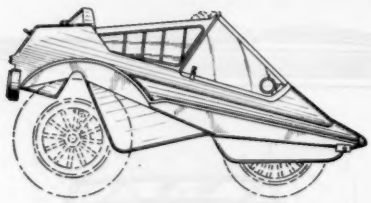


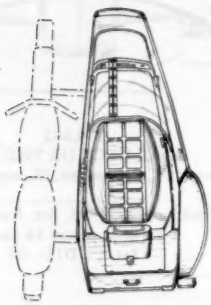
244,842
BOAT DECK OR THE LIKE
Peter C. Granata, Jr., Barrington, Ill., assignor to Classic Boats Inc.
Filed July 30, 1975, Ser. No. 600,308
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—70



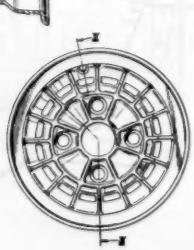
244,843
AIRPLANE
Allen E. Paulson, Van Nuys, Calif., assignor to American Jet Industries, Van Nuys, Calif.
Filed Mar. 22, 1976, Ser. No. 669,196
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—71

244,844
MOTORCYCLE SIDECAR COACH
Craig W. Vetter, Rantoul, Ill., assignor to Vetter Design Works, Inc., Rantoul, Ill.
Filed Feb. 3, 1975, Ser. No. 546,535
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—116

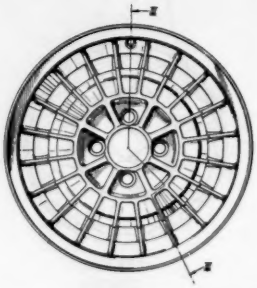


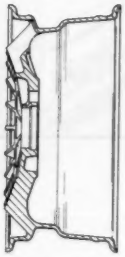


244,845
VEHICLE WHEEL
Richard W. Woodward, Wrotham Heath, England, assignor to GKN Kent Alloys Limited
Filed Aug. 10, 1976, Ser. No. 713,202
Claims priority, application United Kingdom, Mar. 2, 1976, 974723/76
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211

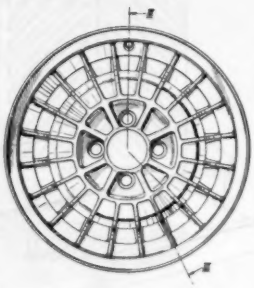


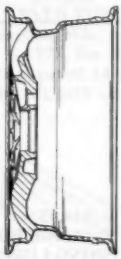
244,846
VEHICLE WHEEL
Richard W. Woodward, Wrotham Heath, England, assignor to GKN Kent Alloys Limited
Filed Aug. 10, 1976, Ser. No. 713,203
Claims priority, application United Kingdom, Mar. 2, 1976, 974722/76
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211



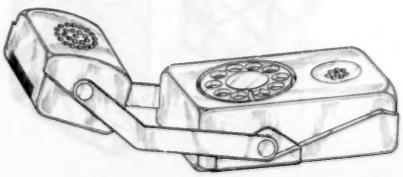


244,847
VEHICLE WHEEL
Richard W. Woodward, Wrotham Heath, England, assignor to GKN Kent Alloys Limited
Filed Aug. 10, 1976, Ser. No. 713,204
Claims priority, application United Kingdom, Mar. 2, 1976, 974724/76
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211



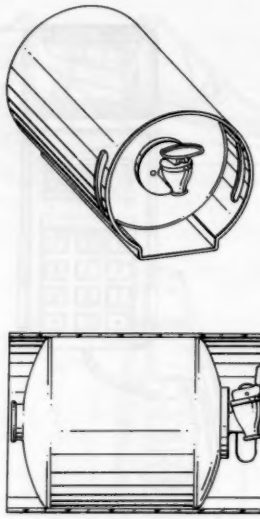


244,848
TELEPHONE SET, OR SIMILAR ARTICLE
Sergio Todeschini, Milan, Italy, assignor to E.T.E. - Electronic Telephone Equipment, S.r.l., Milan, Italy
Filed June 4, 1976, Ser. No. 692,721
Claims priority, application Italy, Feb. 17, 1976, 20699/76
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—56

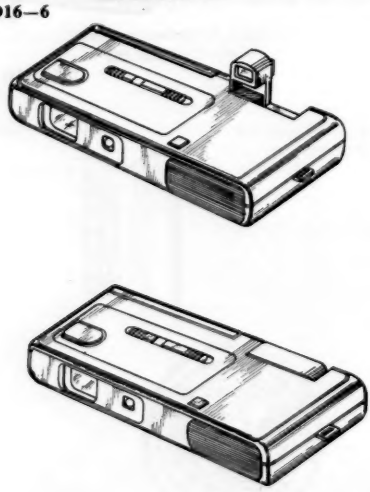


244,849
TELEPHONE SET, OR SIMILAR ARTICLE
Sergio Todeschini, Milan, Italy, assignor to E.T.E. - Electronic Telephone Equipment, S.r.l., Milan, Italy
Filed June 4, 1976, Ser. No. 692,722
Claims priority, application Italy, Feb. 17, 1976, 20699/76
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—56

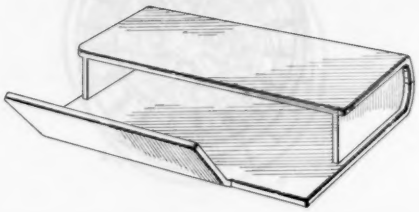
244,850
BEVERAGE DISPENSING CONTAINER OR SIMILAR ARTICLE
Calvin L. Wilson, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.
Filed Oct. 21, 1974, Ser. No. 516,764
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—112



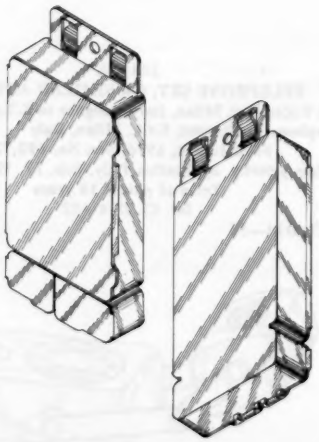
244,851
PHOTOGRAPHIC CAMERA
Kazuo Masuyama, Osaka, Japan, assignor to Sunpack Corporation, Tokyo, Japan
Filed Nov. 25, 1975, Ser. No. 635,035
Claims priority, application Japan, June 2, 1975, 50-2220
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—6



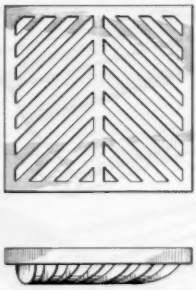
244,852
MEMO PAPER HOLDER
Walter Fieni, Paris, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France
Filed May 13, 1975, Ser. No. 576,951
Claims priority, application France, Nov. 21, 1974, 74.350
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—92



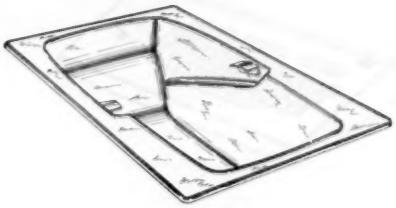
244,853
COMPARTMENTED STORAGE BOX PRIMARILY FOR FISHING LURES
Carl R. Cordell, Jr., 215 Idlewood Drive, Hot Springs, Ark. 71901
Filed Dec. 19, 1975, Ser. No. 642,549
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—14



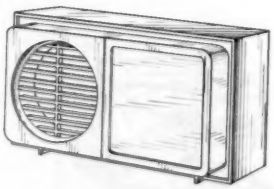
244,854
CATCH BASIN GRATE
Dante A. Salamone, 586 East St., East Weymouth, Mass. 02188
Filed Nov. 18, 1975, Ser. No. 633,079
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—42



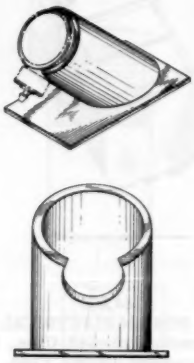
244,855
BATH TUB
Donald W. Doman, Janesville, Wis., assignor to Kohler Co.
Filed Nov. 9, 1973, Ser. No. 414,203
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



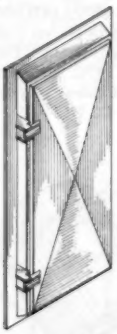
244,856
HOUSING FOR AIR CIRCULATING AND TREATING APPLIANCE
David K. Haufe, Hinsdale, and Gordon Guth, Evanston, both of Ill., assignors to Sunbeam Corporation, Chicago, Ill.
Filed June 20, 1975, Ser. No. 588,869
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—141



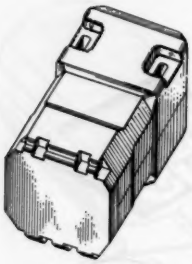
244,857
SPHYGMOMANOMETER STAND
Roger Hayes, 28120 Peacock Ridge Drive, Rancho Palos Verdes, Calif. 90274
Filed July 16, 1976, Ser. No. 705,836
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—21



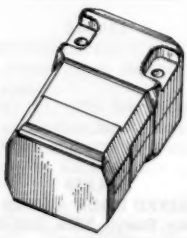
244,858
COMBINED DOOR AND FRAME
Raymond L. Bolender, Sturgis, Mich., assignor to Leland Engineering, Inc., White Pigeon, Mich.
Filed Nov. 26, 1975, Ser. No. 635,622
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—48



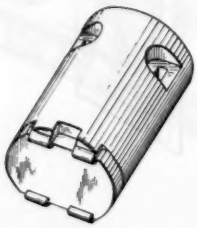
244,859
HOUSING FOR AN ELECTRICAL PLUG
Frank Carmine Jaconette, Trumbull, Conn., assignor to Harvey Hubbell, Incorporated, Orange, Conn.
Filed Jan. 16, 1976, Ser. No. 649,914
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



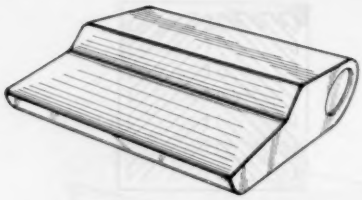
244,860
HOUSING FOR AN ELECTRICAL PLUG
Frank Carmine Jaconette, Trumbull, Conn., assignor to Harvey Hubbell, Incorporated, Orange, Conn.
Filed Jan. 16, 1976, Ser. No. 649,915
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



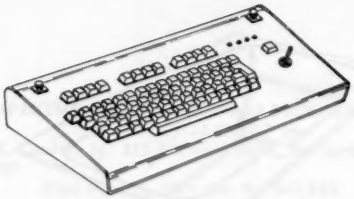
244,861
HOUSING FOR AN ELECTRICAL PLUG
Michael John D'Amato, North Haven, Conn., assignor to Harvey Hubbell, Incorporated, Orange, Conn.
Filed Jan. 16, 1976, Ser. No. 649,916
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



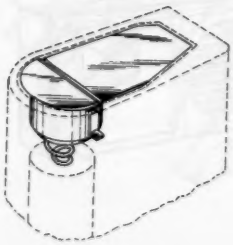
244,862
CASING FOR AN ELECTRONIC CALCULATOR
Barry R. Mathis, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Sept. 25, 1975, Ser. No. 616,782
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B



244,863
KEYBOARD MODULE
David Rolfe Smith, Hillsboro, and Richard Ellwood Hansen, Portland, both of Oreg., assignors to Tektronix, Inc.
Filed Apr. 5, 1976, Ser. No. 673,551
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—45



244,864
LIVING HINGE BATTERY COVER FOR ELECTRONIC DEVICE
Donald Leslie William Brooks, Ashtead, England, assignor to Ronson Corporation, Woodbridge, N.J.
Filed Mar. 26, 1976, Ser. No. 670,723
Term of patent 14 years
Int. Cl. D13—*02*; D27—*05*
U.S. Cl. D13—10

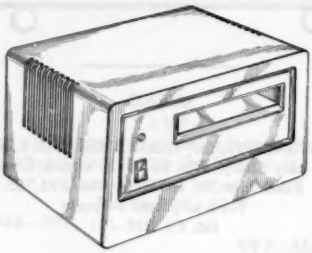


244,865

MAGNETIC TAPE CARTRIDGE TRANSPORT

Collan B. Kneale, and Frank Wilkey, Jr., both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,464
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6

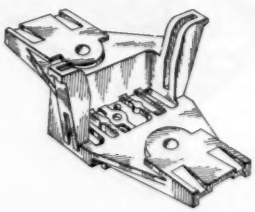


244,866

INSULATOR FOR AN ANTENNA

Franklin Roosevelt DiMeo, Woodbury, and William John Bachman, Mount Laurel, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,260
Term of patent 14 years
Int. Cl. —
U.S. Cl. D14—90

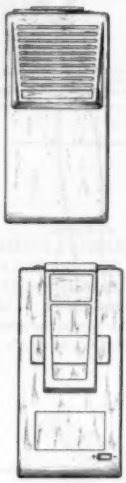


244,867

HOUSING FOR A RADIO RECEIVER

Robert R. Huntington, 4305 Morningside Drive, Lynchburg, Va. 24503, and Henry A. Schaefer, 1219 Cedar Hill Drive, Lynchburg, Va. 24502

Filed Dec. 15, 1975, Ser. No. 640,920
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—68

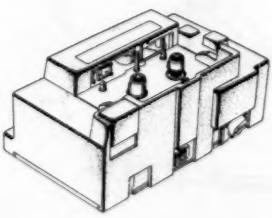


244,868

MICRO-CASSETTE ADAPTER

Yasuo Hattori; Masahiko Sakurada, both of Hachioji, and Kazumi Miyaji, Fuchu, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

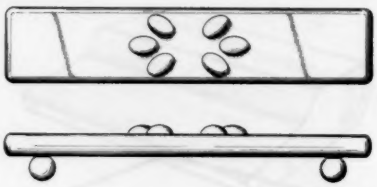
Filed Nov. 24, 1975, Ser. No. 634,830
Claims priority, application Japan, May 28, 1975, 50-21142
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—10



244,869
ANIMAL LEASH
Paul Manley, 5348 27th Ave. S., Minneapolis, Minn. 55417, and Darlene Johnson, 7892 Dunmore Road, St. Paul, Minn. 55119
Filed Sept. 8, 1976, Ser. No. 721,304
Term of patent 3½ years
Int. Cl. D30—*99*
U.S. Cl. D30—39

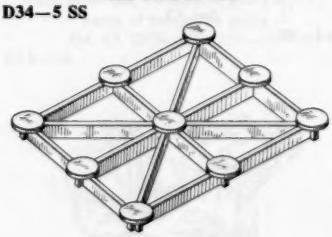
244,870
ANIMAL TETHER
John C. Astley, R.R. 1, West Des Moines, Iowa 50265
Filed Sept. 20, 1976, Ser. No. 725,088
Term of patent 14 years
Int. Cl. D30—*09*
U.S. Cl. D30—44

244,871
MASSAGER-EXERCISER FOR NECK AND BACK
Aldo A. Vincenti, 11 Pershing Drive, Plainville, Conn. 06062
Filed Dec. 5, 1975, Ser. No. 638,103
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D24—36

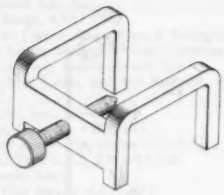


244,872
FOOTBALL HOOP TARGET OR THE LIKE
Charles Wesley Staley, P.O. Box 543, Vinton, Iowa 52349
Filed June 30, 1975, Ser. No. 591,765
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PP

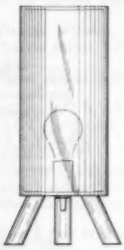
244,873
ELEVATED PATH-WAY EDUCATIONAL GAME DEVICE
Robert W. Halapin, 34 Regina St., Trumbull, Conn. 06611, and William A. Burley, 10 Shagbark Lane, Woodlake, Woodbury, Conn. 06798
Filed Mar. 9, 1976, Ser. No. 665,324
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



244,874
ATTACHABLE PUTTING GUIDE FOR GOLF PUTTERS
David E. Lombardi, Rte. 2, Box 330, Glen Burnie, Md. 21061
Filed Apr. 28, 1976, Ser. No. 681,283
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB

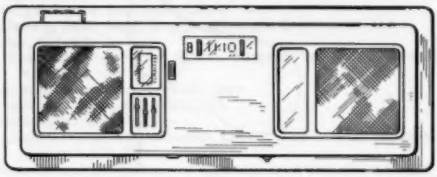


244,875
LAMP
Joseph B. Baca, 739 Inca St., Denver, Colo. 80204
Filed July 24, 1974, Ser. No. 491,566
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 R

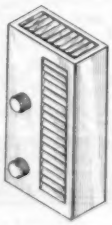


244,876
COMBINED PORTABLE FLUORESCENT AND INCANDESCENT LIGHT
Thomas Zelina, Erie, Pa., assignor to Lighting Systems, Inc., Erie, Pa.
Filed Sept. 16, 1975, Ser. No. 608,055
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R

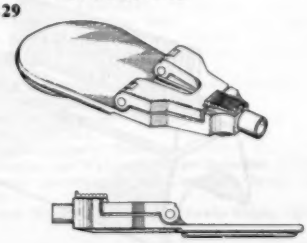
244,877
WALL MOUNTED RADIO, TAPE PLAYER, CLOCK AND DUAL SPEAKER UNIT
John J. McLaughlin, River's Edge Motel, 2700 Absecon Blvd., Atlantic City, N.J. 08401
Filed Nov. 21, 1974, Ser. No. 525,865
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—73



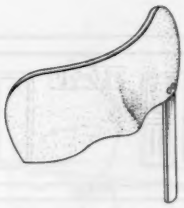
244,878
ELECTRONIC SOUND PRODUCER FOR INDUCING SLEEP OR THE LIKE
Bridget A. Brand, 133 Drexel Road, Ardmore, Pa. 19003
Filed Mar. 1, 1976, Ser. No. 662,600
Term of patent 14 years
Int. Cl. D24—*99*; D26—*05*
U.S. Cl. D24—99



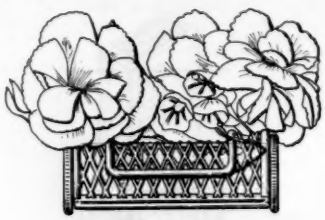
244,879
SPHYGMOMANOMETER SENSOR AND CUFF COUPLING MECHANISM
Joseph J. Manno, La Jolla, Calif., assignor to Ivac Corporation, San Diego, Calif.
Filed Oct. 13, 1976, Ser. No. 731,545
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—29



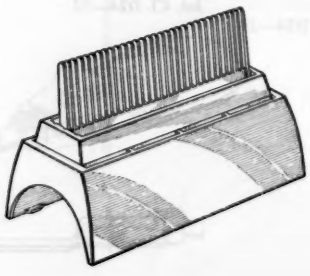
244,880
SPRAY MASK
Barbara J. Terry, 5916 Culview St., Culver City, Calif. 90230
Filed Oct. 29, 1975, Ser. No. 626,856
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D29—8



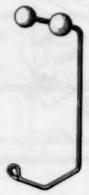
244,881
COMBINED HAIR ROLLER AND ORNAMENT
Florence Berkowitz, 4063 Bedford Ave., Brooklyn, N.Y. 11229
Filed Jan. 8, 1976, Ser. No. 647,347
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—37



244,882
DRYER ATTACHMENTS
Douglas A. Long, Wilton, and Frederick A. Burke, Riverside, both of Conn., assignors to Clairol Incorporated
Continuation-in-part of Ser. No. 533,398, Dec. 16, 1974, Pat. No. Des. 243,558. This application Nov. 17, 1976, Ser. No. 742,446
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—18

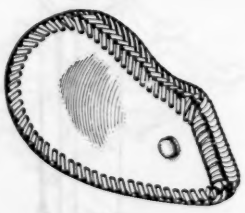


244,883
PURSE HANGER OR SIMILAR ARTICLE
August Rohrmuller, 198-40 32nd Ave., Bayside, N.Y. 11361
Filed July 14, 1975, Ser. No. 595,273
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—2 R



244,884
CARRYALL BAG
Frances E. Dotson, 2706 Villa Maria Road, Bryan, Tex. 77801
Filed Aug. 21, 1975, Ser. No. 606,539
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 C

244,885
COIN PURSE
Max D. Pierson, Rte. No. 2, Butler, Ind. 46721
Filed Feb. 4, 1976, Ser. No. 655,158
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 B



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF JUNE, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A & B Constructors AB: *See—*
Arvidsson, Bengt, 4,031,790.

A.E.C. Societe de Chimie Organique et Biologique: *See—*
Molle, Jean Louis; and Boch, Jean Christian, 4,032,650.

A. H. Robins Company, Incorporated: *See—*
Duncan, Robert Louis, Jr.; and Boswell, Robert Frederick, Jr., 4,032,642.

A. P. C. Industries, Inc.: *See—*
Knippelmier, Gary H., 4,032,841.

Aaltonen, Ragnar Jakob. Apparatus including a pump mixer for coating objects. 4,032,073, Cl. 239-142.000.

AB Olle Lindstrom: *See—*
Lindstrom, Olle Birger, 4,032,693.

AB Volvo Penta: *See—*
Lindfors, Olov Halvar, 4,031,982.

Abex Corporation: *See—*
Kohler, William H., 4,032,197.

Abramson, Harold B. Adjustable entrance door. 4,031,665, Cl. 49-501.000.

Achermann, Heinz, to Mettler Instrumente AG. Apparatus for thermoanalytical investigations. 4,031,740, Cl. 73-15.00B.

Adachi, Keiichi: *See—*
Sakanoue, Seiki; Tsubota, Motohiko; Fuseya, Yoshiharu; Adachi, Keiichi; and Shishido, Tadao, 4,032,349.

Adair, Joseph Bryan. Combination steam-gas generator engine. 4,031,697, Cl. 60-39.550.

Adams, Frank H.: *See—*
Knapik, H. Peter G.; and Adams, Frank H., 4,032,475.

Adams, Richard G.; and Sello, Stephen B., to J. P. Stevens & Co., Inc. Coupling agent for fibrous glass substrates. 4,032,554, Cl. 260-448.80R.

Adams, Sidney George William, to James Burn Bindings Limited. Binding of perforated sheets. 4,031,585, Cl. 11-1.00A.

Adco Company: *See—*
Hemphill, Charles Wayne, 4,032,015.

Advent Corporation: *See—*
Holman, Tomlinson M., II, 4,032,855.

Advertising Displays Corporation: *See—*
Weiss, Donald P., 4,032,014.

AGA Aktiebolag: *See—*
Botos, Imre; and Hellquist, Ivan Aldine, 4,031,887.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Coeure, Philippe; Jadot, Jean Pierre; and Peuzin, Jean Claude, 4,032,217.

Ageton, Roy R. Global time system. 4,032,754, Cl. 235-78.00R.

AGFA-Gevaert, A.G.: *See—*
Deml, Reinhold; Greis, Ulrich; and Kapfhammer, Wilhelm, 4,032,343.
Lermann, Peter; Stumpf, Friedrich; and Fauth, Gunter, 4,032,935.

AGFA-GEVAERT N.V.: *See—*
Van Poucke, Raphael Karel; Ailliet, Marc Willem; Van Wijnsberghe, Leo August; and Benoy, Gaston Jacob, 4,032,347.
Vermeylen, Rene Leonard; and Onghena, Jozef Jan, 4,032,284.

Agnew, S. J.: *See—*
Jones, Allen Jacob, 4,032,201.

Ahmed, Adel Abdel Aziz, to RCA Corporation. Current scaling circuits. 4,032,839, Cl. 323-19.000.

Aiba, Masahiko: *See—*
Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, 4,032,924.

Aibe, Tsuyoshi; Sugiura, Yoshiaki; and Okada, Yuzuru, to Nissan Motor Co., Ltd. Knee protector in motor vehicle. 4,032,175, Cl. 280-751.000.

Ailliet, Marc Willem: *See—*
Van Poucke, Raphael Karel; Ailliet, Marc Willem; Van Wijnsberghe, Leo August; and Benoy, Gaston Jacob, 4,032,347.

Air Products and Chemicals, Inc.: *See—*
Uffner, Melville W.; and Beitchman, Burton D., 4,032,596.

Airborne Mfg. Co.: *See—*
Singh, Karnel; Denny, Thomas A.; Fritz, Daniel P.; and Rising, Orville C., 4,031,610.

Airfix Plastics Limited: *See—*
Dubery, Roy Frederick; and Chivrall, Ronald Arther, 4,032,037.

Airprint Systems, Inc.: *See—*
Warning, Walter B., Sr.; and Warning, Walter B., Jr., 4,032,670.

Aizawa, Hiroshi: *See—*
Ito, Tadashi; Uchidoi, Masanori; Taguchi, Tetsuya; Tunekawa, Tokuichi; Aizawa, Hiroshi; and Takishima, Yoshiyuki, 4,032,933.

Ajinomoto Co., Inc.: *See—*
Kida, Takao; Mizuno, Hiroshi; and Okutsu, Masaru, 4,032,325.

Aker, Jimmie R.: *See—*
Cullen, Roy H.; and Aker, Jimmie R., 4,031,969.

Aktiebolaget Nike Hydraulik: *See—*
Bjork, Bengt Anders, 4,031,633.

Aktiengesellschaft Gebrueder Loepfe: *See—*
Domig, Rene; Morf, Ernst; and Loepfe, Erich, 4,031,924.

Akutsu, Hidezoh: *See—*
Kobayashi, Yoshichika; Akutsu, Hidezoh; and Iwama, Katsuaki, 4,032,812.

Aladdin Industries, Incorporated: *See—*
Schifman, Edward J., 4,032,152.

Albano-Muller, Lothar: *See—*
Zapf, Gerhard; Albano-Muller, Lothar; Kiethe, Horst; and Rohlig, Rainer, 4,032,335.

Albert, Richard D. Method and apparatus producing plural images of different contrast range by X-ray scanning. 4,032,787, Cl. 250-402.000.

Albertson, Noel F.: *See—*
Wentland, Mark P.; and Albertson, Noel F., 4,032,529.

Alcyon Electronique et Physique S.A.: *See—*
Ravussin, Pierre, 4,031,755.

Aldridge, David Cecil; Crawley, Graham Charles; and Strawson, Colin John, to Imperial Chemical Industries Limited. 3,3a,6,6a-Tetrahydrofuro[3,4-b]furan derivatives and anti-ulcer composition containing them. 4,032,651, Cl. 424-279.000.

Alessio, Lorenzo Ercole, to Black and Decker Manufacturing Company, The. Bearing arrangement for the armature shaft of an electric motor. 4,032,203, Cl. 308-72.000.

Alexander, Carl J., to Wells Manufacturing Corporation. Portable power driven implement. 4,031,622, Cl. 30-392.000.

Alfeis, Franz J.; and Goldsmith, Raymond W., to Upson Company, The. Fire retardant webs and internal treatment therefor. 4,032,393, Cl. 162-159.000.

Allard, Francois. Construction member. 4,032,680, Cl. 428-119.000.

Allegheny Ludlum Industries, Inc.: *See—*
Choby, Edward G., Jr., 4,032,366.
Reen, Orville, 4,032,336.

Allen, Cloy L.; and Hook, Bobby L. Trailer hitch locking device. 4,032,171, Cl. 280-507.000.

Allen, Edgar Robert, to Post Office, The. Measurement of noise in a communication channel. 4,032,716, Cl. 179-15.0BF.

Allen, Robert K.: *See—*
Meyer, Burton C.; and Allen, Robert K., 4,032,295.

Allied Upholstery Mfg. Inc.: *See—*
Kanowsky, Vincent C.; and Blanc, Lloyd A., 4,031,577.

Allis-Chalmers Corporation: *See—*
Atherton, Ralph R., 4,032,187.
Jenness, Raymond C., 4,032,199.

Alneri, Enzo: *See—*
Bottaccio, Giorgio; Chiusoli, Gian Paolo; Alneri, Enzo; Marchi, Marcello; and Lana, Giulio, 4,032,555.

Alpha Industries, Inc.: *See—*
Borzym, Alexander; and Borzym, John J., 4,031,792.

Altman, Daniel E.; Barstow, Glidden J.; and Geller, Myer, to United States of America, Navy. Metal vapor laser tube. 4,032,863, Cl. 331-94.50D.

Aluminum Company of America: *See—*
Dell, M. Benjamin, 4,032,653.
Jordan, Charles L., 4,031,837.
Willis, Wilburn Coy, 4,032,034.

Alwine, John E. Carburetor. 4,031,874, Cl. 123-134.000.

Alza Corporation: *See—*
Urquhart, John; Chandrasekaran, Santosh Kumar; and Shaw, Jane Elizabeth, 4,031,894.

Amemiya, Youichi: *See—*
Inaba, Seiuemon; Shimizu, Kanryo; Ito, Kohei; Amemiya, Youichi; and Gamo, Gotaro, 4,031,811.

American Air Filter Company, Inc.: *See—*
Applewhite, Grant D., 4,031,819.

American Biltrite Inc.: *See—*
Guyer, Nathan E., 4,031,757.

American Chain & Cable Company, Inc.: *See—*
Bell, Edward L.; and Ross, Ivan L., 4,031,829.

American Colloid Company: *See—*
Hughes, John, 4,032,701.

American Cyanamid Company: *See—*
Cross, Barrington; and Walworth, Bryant Leonidas, 4,032,526.
Schmitt, Joseph Lawrence, Jr.; and Castellion, George Augustus, 4,032,435.
Spencer, Frank Russell; and Kolodny, Edwin Ralph, 4,032,496.

American District Telegraph Company: *See—*
Galvin, Aaron A.; Edson, James B.; and Bean, James O. C., 4,032,916.
American Electronic Laboratories, Inc.: *See—*
Sikina, Thomas V., Jr.; Schafer, Robert H.; and Klopach, Robert T., 4,032,921.
American Home Products Corporation: *See—*
Freed, Meier E.; and Potoski, John R., 4,032,639.
Hegarty, Charles Paul; and Pietryk, Helen C., 4,032,659.
American Products, Inc.: *See—*
Klenke, Richard J., 4,031,834.
American Screen Printing Equipment Company: *See—*
Bubley, Henry J.; and Krutsch, John R., 4,031,824.
Amerine, James Dalton, to O. M. Scott & Sons Company. Material spreader. 4,032,074, Cl. 239-685.000.
AMP Incorporated: *See—*
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Grinberg, Jan; Fraas, Lewis M.; Bleha, William P., Jr.; and Braatz, Paul O., 4,032,954.
Bliss & Laughlin Ind., Inc.: *See—*
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Blohm & Voss AG: *See—*
Schmidt, Willy; and Sadler, Karl-Otto, 4,031,838.
Blommers, Elizabeth A.; and Moult, Roy H., to Koppers Company, Inc. Curable resorcinol terminated urea-formaldehyde resins. 4,032,515, Cl. 260-70.00R.
Bloom, Allen; Bartolini, Robert Alfred; and Weakliem, Herbert Alfred, to RCA Corporation. Method of improving the sensitivity of organic volume phase holographic recording media. 4,032,340, Cl. 96-27.00H.
Bloom, Allen; and Hung, Ling Kong, to RCA Corporation. Electro-optic device. 4,032,470, Cl. 252-299.000.
Blount, David H. Process for the production of phenol silicate compounds and their condensation products. 4,032,511, Cl. 260-46.50R.
Blum, Kenneth J.; Dodson, Floyd; Jarrett, Robert P.; and Ravnsborg, Norman T., to United States Steel Corporation. Combination burner. 4,032,287, Cl. 431-175.000.
Blum, Rudolf; and Stiller, Bernd, to Triumph Werke Nurnberg A.G. Keyboard actuated paper insertion and ejection mechanism. 4,031,995, Cl. 197-138.00A.
Bobrick, Mitchell; Quin, Murray L.; and Buzan, Morris M., to Emerson Electric Co., a part interest. Illumination system. 4,032,775, Cl. 240-73.00R.
Boch, Jean Christian: *See—*
Molle, Jean Louis; and Boch, Jean Christian, 4,032,650.
Boeing Company, The: *See—*
Bonne, Jimmie Harold; and Simpson, Robert D., 4,032,093.
Lewis, Richard W., 4,032,758.
McAvoy, John Jerome, 4,032,088.
Boeters, Karl-Ernst, to Robert Bosch G.m.b.H. Multiple hybrid semiconductor structure. 4,032,964, Cl. 357-74.000.
Boge, Dallas F.; and Olsen, Roderick, Jr. Chop saw. 4,031,788, Cl. 83-380.000.
Bohmrich, Jack L.; Bowden, William A., Jr.; and Pedersen, Vernon G., to Dacor Corporation. Tank filter. 4,032,311, Cl. 55-385.00C.
Boisrayon, Gerald Marc Albert; and Martin, Gilbert Marius Henri, to Etat Francais. Process and apparatus for recovering sunken wrecks. 4,031,840, Cl. 114-51.000.
Boldebuck, Edith M.; and Joynson, Catherine W., to General Electric Company. Method of restoring or maintaining an electrocoating bath. 4,032,420, Cl. 204-181.000.
Bond, Curtis J.: *See—*
Schieser, Warren J.; Sneeden, John R.; Feltner, R. Alan; and Bond, Curtis J., 4,032,106.
Bonne, Jimmie Harold; and Simpson, Robert D., to Boeing Company, The. Adaptive energy management for vertical speed control of an aircraft. 4,032,093, Cl. 244-180.000.
Boom, Roger W.; Moses, Ronald W., Jr.; Peterson, Harold A.; and Young, Warren C., to Wisconsin Alumni Research Foundation. Shielded superconducting inductor device. 4,032,959, Cl. 323-44.00F.
Boots Company Limited, The: *See—*
Lush, Gerald Bertram, 4,032,320.
Borden, Inc.: *See—*
Columbus, Peter Spiros, 4,032,487.
Borg-Warner Corporation: *See—*
Miller, Alan Leonard; and Ivey, John Saxon, 4,031,782.
Sheth, Rajesh N., 4,032,269.
Sheth, Rajesh N.; and Guzy, Raymond L., 4,032,270.
Borror, Alan L., to Polaroid Corporation. Phthalides and naphthalides. 4,032,545, Cl. 260-343.20R.
Borzym, Alexander; and Borzym, John J., to Alpha Industries, Inc. Hammer ram press. 4,031,792, Cl. 83-601.000.
Borzym, John J.: *See—*
Borzym, Alexander; and Borzym, John J., 4,031,792.
Bosch, Paul, to Robert Bosch G.m.b.H. Hydraulic control device. 4,032,260, Cl. 417-216.000.
Boschi, Richard C., to Pacific Gunsight Company. Rotary shot shell reloader. 4,031,804, Cl. 86-23.000.
Boswell, Robert Frederick, Jr.: *See—*
Duncan, Robert Louis, Jr.; and Boswell, Robert Frederick, Jr., 4,032,642.
Botos, Imre; and Hellquist, Ivan Aldine, to AGA Aktiebolag. Breathing

apparatus providing pressure compensation. 4,031,887, Cl. 128-142.00R.

Bottaccio, Giorgio; Chiusoli, Gian Paolo; Alneri, Enzo; Marchi, Marcello; and Lana, Giulio, to Montedison Fibre S.p.A. Process for the carboxylation of organic substrates with carbon dioxide. 4,032,555, Cl. 260-465.00D.

Boucherle, Andre Louis: *See*—
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; and Broll, Madeleine, 4,032,660.

Boughtflower, Charles Arthur: *See*—
Daly, Daniel; Davis, Kenneth Paul; and Boughtflower, Charles Arthur, 4,031,771.

Boulanger, Michelle: *See*—
Beregi, Laszlo; Hugon, Pierre; Duhault, Jacques; and Boulanger, Michelle, 4,032,658.

Bourns, Inc.: *See*—
Singleton, Delbert Lowell, 4,032,881.

Bowden, William A., Jr.: *See*—
Bohmrich, Jack L.; Bowden, William A., Jr.; and Pedersen, Vernon G., 4,032,311.

Bowers Machine Company Limited: *See*—
Burgess, Basil Arthur, 4,032,117.

Bowman, William G.: *See*—
Arganbright, Robert P.; and Bowman, William G., 4,032,583.
Cooley, Stone D.; Arganbright, Robert P.; Bowman, William G.; and Henery, James D., 4,032,458.

Boyce, William N., to Karsten, Eugene E., a part interest. Arrangement for testing an alarm system and method. 4,032,909, Cl. 340-214.000.

Boyer, Charles B., to Crucible Inc. Method and apparatus for pressurizing hot-isostatic pressure vessels. 4,032,337, Cl. 75-226.000.

Boyer, Jean-Jacques, to Societe Anonyme Secmafer. Armoured assault car. 4,031,807, Cl. 89-36.00K.

Braatz, Paul O.: *See*—
Grinberg, Jan; Fraas, Lewis M.; Bleha, William P., Jr.; and Braatz, Paul O., 4,032,954.

Brackmann, Warren A.; and Dilanni, Daniel, to Rothmans of Pall Mall Canada Limited. Winnowing of tobacco. 4,031,903, Cl. 131-109.00B.

Braddon, David V.: *See*—
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Bradley, James B., Jr. Ophthalmic device. 4,032,223, Cl. 351-132.000.

Braid, David Thomas: *See*—
Snyder, Gene Larry; and Braid, David Thomas, 4,032,213.

Braig, Siegfried: *See*—
Osberghaus, Rainer; Umbach, Wilfried; Gloxhuber, Christian; and Braig, Siegfried, 4,032,630.

Brand, Derek A.: *See*—
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Brandt, Edward E.; and Brandt, Margaret K. Manipulative chromosomal model. 4,031,635, Cl. 35-20.000.

Brandt, Margaret K.: *See*—
Brandt, Edward E.; and Brandt, Margaret K., 4,031,635.

Brannan, Leonard M.: *See*—
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Branson Ultrasonics Corporation: *See*—
Obeda, Edward G., 4,032,382.

Braudeau, Pierre; and Maillet, Alfred Marie Aime, to Carel Fouche Languepin. Reaming device for machining by electro-erosion. 4,032,741, Cl. 219-69.00V.

Braun, Wolfgang, to Siemens Aktiengesellschaft. Pressurized-water reactor emergency core cooling system. 4,032,396, Cl. 176-38.000.

Braune, Rudi Helmut. Rotary drives. 4,031,779, Cl. 74-650.000.

Brauning, Egon: *See*—
Muller-Deisig, Wolfgang; and Brauning, Egon, 4,032,190.

Bredt-Kat, Inc.: *See*—
Bredt, Mainhardt, 4,031,841.

Bredt, Mainhardt, to Bredt-Kat, Inc. Controlled air film hull for watercraft. 4,031,841, Cl. 114-67.00A.

Bricmont, Francis H., to Caterpillar Tractor Co. Warm form cooling and heat recovery tunnel. 4,032,365, Cl. 148-12.00R.

Briggs & Stratton Corporation: *See*—
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Bristol-Myers Company: *See*—
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British Petroleum Company Limited, The: *See*—
Oldham, Guy Franklin, 4,032,439.

British Steel Corporation: *See*—
Lawson, Robert; and Young, Reginald S., 4,032,308.

Brock, Walter B. Automatic safety lock for firearms. 4,031,649, Cl. 42-70.00F.

Broll, Madeleine: *See*—
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; and Broll, Madeleine, 4,032,660.

Brouwers, Alexander P.: *See*—
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., 4,031,868.

Brown, Alvin E., to Du Pont de Nemours, E. I., and Company. Method and apparatus for measuring fluid flow in small bore conduits. 4,032,259, Cl. 417-43.000.

Brown, Boveri & Cie. A.G.: *See*—
Rohr, Franz Josef; and Holick, Hubert, 4,032,285.

Brown, Christopher Kingsley; and Wion, Donald Andrew, to AMP Incorporated. Closed barrel terminal applicator. 4,031,613, Cl. 29-628.000.

Brown, Dale H.: *See*—
Vakil, Himanshu B.; and Brown, Dale H., 4,031,706.

Brown, James R.: *See*—
Johnson, Frederick M.; Brown, James R.; and Reitz, Rex L., 4,032,689.

Brown, Joe H.: *See*—
Cruse, Clyde L., Jr.; and Brown, Joe H., 4,032,123.

Brown Oil Tools, Inc.: *See*—
Baugh, John L.; and Baugh, Hollis A., 4,032,183.

Brown, Richard E., to Warner-Lambert Company. Indolothiopyrones. 4,032,537, Cl. 260-326.12R.

Brown, Richard W.: *See*—
Jatczak, Chester F.; and Brown, Richard W., 4,032,369.

Broyles, Douglas Wright; and Stark, Troy Cecil, to Singer Company, The. Nonlinear scan drive reader with variable clock correction. 4,032,888, Cl. 340-146.30F.

Bruce, Ralph E., to Production Control Units, Inc. Dispensing apparatus having temperature compensating fluid metering. 4,032,041, Cl. 222-14.000.

Brunetti, Heimo: *See*—
Mazour, Zdenek; and Brunetti, Heimo, 4,032,602.

Brunk, Ronald M. Wooden block planter with supporting legs. 4,031,663, Cl. 47-66.000.

Bryceland, Maurice Cyril, to Waldman Corporation. Push-pull switch for use in an electronic watch. 4,032,731, Cl. 200-16.00B.

Brynes, Leon R.: *See*—
Reiss, Oscar; Brynes, Leon R.; and De Cicco, Frank, 4,032,028.

BTU Engineering Corporation: *See*—
Soderlund, Martin I.; and Pray, R. Chester, 4,032,290.

Bubley, Henry J.; and Krutsch, John R., to American Screen Printing Equipment Company. Sheet feed and takeoff assembly for printers. 4,031,824, Cl. 101-126.000.

Buchel, Karl Heinz: *See*—
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Buchi, George, to Hoffmann-La Roche Inc. Unsaturated ketones. 4,032,577, Cl. 260-594.000.

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Buchwald, James P.: *See*—
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Buckle, Derek Richard: *See*—
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Bundy, Gordon L., to Upjohn Company, The. PG-type 1,11-lactones. 4,032,543, Cl. 260-343.20F.

Bunger, David A., to D. H. Baldwin Company. Tone signal modulation system. 4,031,795, Cl. 84-1.250.

Bunker Ramo Corporation: *See*—
Miller, Frank Donald, 4,032,832.

Bunnomori, Yukinari; Yamada, Nobuo; and Nakata, Tetsuya, to Osaka Soda Co., Ltd. Cured or uncured rubber composition containing homopolymers or copolymers of epihalohydrins. 4,032,479, Cl. 260-2.00A.

Buonavita, Carlos Ernesto, to Burroughs Corporation. Modular constant current power supply. 4,032,830, Cl. 363-25.000.

Burch, Hadley K., to B/K Patent Development, Inc. Snap-ating mechanisms. 4,032,734, Cl. 200-67.0DA.

Burch, Lyndon W., to B/K Patent Development, Inc. Ambient-compensated circuit breaker. 4,032,876, Cl. 337-75.000.

Burell, Vincent A.: *See*—
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Burg, Irving X. Expandable and contractible rotary well drilling bit. 4,031,972, Cl. 175-263.000.

Burgess, Basil Arthur, to Bowers Machine Company Limited. Paste mixer. 4,032,117, Cl. 259-108.000.

Buriks, Rudolf S.; Fauke, Allen R.; and Mange, Franklin E., to Petrolite Corporation. Oxyalkylated cyclic phenol-aldehyde resins and uses therefor. 4,032,514, Cl. 260-51.0EP.

Burk, Wayne E.; and Hamilton, William B., to Stanadyne, Inc. Tappet metallurgy. 4,032,334, Cl. 75-128.00C.

Burke, Phillip J.: *See*—
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Burkhard, Hermann; Entschel, Roland; and Steinemann, Willy, to Sandoz Ltd. 1-Aminoalkylene-3-cyano-4-methyl-6-hydroxy-1,2-dihydropyrid-2-ones. 4,032,532, Cl. 260-294.900.

Burlington Industries, Inc.: *See*—
Thomas, Lorimer Phillip; and Walker, Robert Harold, 4,031,690.

Burnett, James T.; and Hendrix, Arnold P. Means for activating hydraulic motors. 4,031,702, Cl. 60-398.000.

Burnette, Richard D., to General Atomic Company. Fuel leak detection apparatus for gas cooled nuclear reactors. 4,032,395, Cl. 176-19.0LD.

Burnham, David Robert, to Imperial Chemical Industries Limited. Oligomerization of ethylene. 4,032,590, Cl. 260-683.15D.

Burns, William S., Jr., to Western Electric Company, Inc. Releasably locked mounting assembly for telephone dials. 4,032,727, Cl. 179-178.000.

Burroughs Corporation: *See*—
Buonavita, Carlos Ernesto, 4,032,830.
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Busch, Dennis Gene, to International Business Machines Corporation. Tab repositioning system. 4,031,996, Cl. 197-176.000.
Busetto, Carlo: *See—*
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Butterworth, Edmund Morton, to Cutler-Hammer, Inc. Contact unit. 4,032,735, Cl. 200-68.000.
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Butyagin, Pavel Anatolievich: *See—*
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Cable Conveyor Systems, Inc.: *See—*
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Cady, Percy Luther, to Houdaille Industries, Inc. Punch and stripper assembly. 4,031,787, Cl. 83-140.000.
Cagle, Harlan R., to Sahlin International, Inc. Rotary spool valve. 4,031,918, Cl. 137-625.230.
Cailloux, Paul, to Promecam Sisson-Lehmann. Machine tool apron guiding system. 4,031,737, Cl. 72-456.000.
Califone International, Inc.: *See—*
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Calkins, George B.: *See—*
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Caloyannides, Michael A., to Rockwell International Corporation. Adjustable digital filter for high speed digital transmission. 4,032,762, Cl. 235-152.000.
Camahort, Jose L. Apparatus for producing improved high strength filaments. 4,031,851, Cl. 118-49.100.
Camerano, Angelo, to Monorapid S.A.S. di Camerano Angelo & C. Fitting for a radiator in a single duct heating system. 4,031,916, Cl. 137-561.00A.
Camerik, Eduard, to U.S. Philips Corporation. Video player having safety devices actuated by unlatching. 4,032,971, Cl. 358-128.000.
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Camras, Marvin, to IIT Research Institute. Video transducer system and method with tape drag between the reel and the capstan. 4,032,985, Cl. 360-93.000.
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Candy, James Charles; and Ching, Yau-Chau, to Bell Telephone Laboratories, Incorporated. Analog to digital converter with noise suppression. 4,032,914, Cl. 340-347.0AD.
Cannella, Joseph L., to Candel, Inc. Day-night programmable thermostat. 4,032,069, Cl. 236-46.00R.
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Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, 4,032,137.
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Carpenter, Walter M. Golfer's training device. 4,032,157, Cl. 273-183.00E.
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Carter, Kenneth G. Lockable wedge. 4,032,247, Cl. 403-409.000.
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CBS Inc.: *See—*
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Cecchini, Jack. Stringed musical instrument. 4,031,801, Cl. 84-465.000.
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Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Jefferson, Mark T.; Shibakawa, Riichiro; and Tone, Junsuke, to Pfizer Inc. Mixture of antibiotics produced by new species of streptosporangium. 4,032,632, Cl. 424-121.000.
Cepuritis, Talivaldis, to Signode Corporation. Sealless strap connection means. 4,031,594, Cl. 24-20.0EE.
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Champion Spark Plug Company: *See—*
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Chan, Kwok Yan, to W. Haking Industries, Ltd. Retractable camera. 4,032,940, Cl. 354-219.000.
Chan, Stephen J. C., to Burroughs Corporation. Uniform current level control for display panels. 4,032,818, Cl. 315-169.00R.
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Chen, Tommy. Illuminated action toy. 4,031,660, Cl. 46-228.000.
Chereda, Wasiliy. Trailer for transporting motorcycles. 4,032,167, Cl. 280-106.00T.
Chester, Russell L. Squirrel-proof post. 4,031,856, Cl. 119-51.00R.
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DeVitis, Louis. Apparatus for grooving concrete. 4,032,249, Cl. 404-89.000.
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Dolan, Courtney F.; and Ruettinger, Thurman O., to Chrysler Corporation. Coupling apparatus for full time four wheel drive. 4,031,780, Cl. 74-711.000.
Domig, Rene; Morf, Ernst; and Loepfe, Erich, to Aktiengesellschaft Gebrueder Loepfe. Electronic equipment for monitoring yarn travel on a textile machine. 4,031,924, Cl. 139-336.000.
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Donaldson, John W.; Sharma, Sheree N.; and Themelis, Nicholas John, to Kennecott Copper Corporation. Pyrometallurgical recovery of copper from slag material. 4,032,327, Cl. 75-72.000.
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Dorer, Casper John, Jr.; and Miller, Clark Ober, to Lubrizol Corporation, The. Fuel compositions containing esters and nitrogen-containing dispersants. 4,032,304, Cl. 44-70.000.
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Dotzer, Richard; Hauschildt, Hans-Georg; Todt, Enno, deceased; by Todt, Susanne, legal heir; and by Todt, Ruth Katharina, legal heir, to Siemens Aktiengesellschaft. Electroplating bath and method for the electrodeposition of bright aluminum coatings. 4,032,413, Cl. 204-14.00N.
Douda, Bernard E.; and Tanner, John E., Jr., to United States of America, Navy. Cinnamic acid containing pyrotechnic smoke composition. 4,032,374, Cl. 149-19.800.
Douglas, Lawrence M.; Finelli, Patrick L.; Staller, Norman D.; and Slavitter, Frederick, to Polaroid Corporation. Latched shutter system having automatic delay of latch reset. 4,032,941, Cl. 354-230.000.
Douglass, Robert J., to Raymond Lee Organization, Inc., The. Oil cleaning system comprising an engine block adapter and centrifugal cleaning means. 4,032,447, Cl. 210-168.000.
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Doyle, Frank Peter; Cantello, Barrie Christian Charles; Buckle, Derek Richard; and Smith, Harry, to Beecham Group Limited. 3-Cyano-4-hydroxy coumarin derivatives. 4,032,544, Cl. 260-343.20R.
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Driver, W. B. Flexible drill pipe. 4,031,713, Cl. 64-2.00P.
Droscher, Walter; Winter, Kurt; and Meier, Werner, to Siemens Aktiengesellschaft. Logic level conversion system. 4,032,800, Cl. 307-296.00A.
Dubery, Roy Frederick; and Chivrall, Ronald Arther, to Airfix Plastics

Limited. Closure and fastener for trash bins. 4,032,037, Cl. 220-335.000.

Dubin, Robert R.; and Roth, Walter L., to General Electric Company. Fuel cell with hydronium beta-alumina electrolyte. 4,032,694, Cl. 429-33.000.

Dudley, William A., to Teledyne, Inc. Circulating valve. 4,031,960, Cl. 166-317.000.

Dufour, Patrick. Hydrogen-oxygen fuel cell for use with internal combustion engines. 4,031,865, Cl. 123-1.00A.

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Dunn, John C. Smoking tube with check valve. 4,031,905, Cl. 131-173.000.

Dunning, Leon Tucker. Transfer mechanism. 4,032,388, Cl. 156-568.000.

Dunnington, Richard Harry; Viglianco, Carl Michael; and Wilkens, George Rudolph, to RJR Archer, Inc. Laminated backing structure for composite lithographic plate. 4,032,684, Cl. 428-332.000.

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Dworkin, Robert Dally; and Ejk, Adam Joseph, to M & T Chemicals Inc. One step method for preparing non-stoichiometric diorganotin carboxylates using a solid phase reaction. 4,032,552, Cl. 260-414.000.

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Fisher, Maurice; Kruger, Michael; and Maber, Terence Walter, to Rolls-Royce (1971) Limited. Removal of aluminium rich coatings from heat resisting alloys. 4,032,359, Cl. 134-3.000.

Fitzgerald, William Maurice Bard. Pressurized hydraulic sump system. 4,031,920, Cl. 138-31.000.

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Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H.: *See—*
Theurer, Josef, 4,031,625.
Fraser, Irene A. E., to Tenneco Chemicals, Inc. Surface-coating compositions containing calcium salt loss-of-dry inhibitors and a method of preparing same. 4,032,354, Cl. 106-260.000.
Frask, Theodore E.: *See—*
Mandel, Alan F.; Capuano, Louis M.; Frask, Theodore E.; and Bedel, Denis E., 4,032,882.
Frazar, Joseph H., to General Electric Company. Laundry machine improved water temperature control and method. 4,031,911, Cl. 137-3.000.
Freed, Meier E.; and Potoski, John R., to American Home Products Corporation. 2,3,4,4a-Tetrahydro-1H-pyrazino[1,2-a,]quinoxalin-5(6H)-ones and derivatives thereof for relieving hypertension. 4,032,639, Cl. 424-251.000.
French, Carroll B.: *See—*
Schroeter, Siegfried H.; VanWinkle, Jon; and French, Carroll B., 4,032,673.
Frey, Otto, to Sulzer Brothers Limited. Prosthetic acetabulum. 4,031,570, Cl. 3-1.912.
Fried, Mark A.: *See—*
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Friedrichsfeld GmbH Steinzeug-und Kunststoffwerke: *See—*
Heimke, Gunther; and Griss, Peter, 4,031,571.
Frink Sno-Plows: *See—*
Farrell, Eugene A., 4,031,966.
Frisch, Donald H. Shopping cart shelf assembly. 4,032,164, Cl. 280-33.99A.
Fritz, Daniel P.: *See—*
Singh, Karnel; Denny, Thomas A.; Fritz, Daniel P.; and Rising, Orville C., 4,031,610.
Froelich, Reinhard; and Yant, Howard W., to Westinghouse Electric Corporation. Combined solid and liquid system for controlling nuclear reactors. 4,032,401, Cl. 176-86.00R.
Frohmader, Sigrun: *See—*
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Frosz, Henryk N. Apparatus for delivering fluid grinding material. 4,031,671, Cl. 51-263.000.
Fryer, Rodney Ian; and Walser, Armin, to Hoffmann-La Roche Inc. Triazolobenzodiazepines. 4,032,535, Cl. 260-308.00R.
Frymaster Corporation, The: *See—*
Price, George M., 4,032,749.
Fuji Electric Company Ltd.: *See—*
Kiyokuni, Nobuaki, 4,032,988.
Fuji Jukogyo Kabushiki Kaisha: *See—*
Suga, Yoshiyuki; Kita, Tsutomu; and Harada, Ryusuke, 4,031,699.
Yamazaki, Nobuo; Ito, Takeshi; Katsurada, Tetsuro; and Habara, Yasuhiko, 4,031,700.
Yasuda, Hiroki; Sawafuji, Shuji; and Suzuki, Hitoshi, 4,031,867.
Fuji Oil Company, Ltd.: *See—*
Obata, Shizuo; Yamato, Yukiomi; and Taniguchi, Hitoshi, 4,032,666.
Tatsumi, Chuji; Hashimoto, Yukio; Terashima, Masahiko; and Matsuo, Takahal, 4,032,405.
Fuji Photo Film Co., Ltd.: *See—*
Furutachi, Nobuo; Nakamura, Kotaro; Yamada, Minoru; and Arai, Atsuaki, 4,032,346.
Inouye, Kozo; Yokota, Yukio; Okumura, Akio; Kubodera, Seiiti; and Shiba, Keisuke, 4,032,345.
Kido, Keishiro; Tsuboi, Masayoshi; and Arai, Noboru, 4,032,348.
Kido, Keishiro; Honjo, Satoru; and Sato, Masamichi, 4,032,691.
Nakamura, Takeshi, 4,032,790.
Sakanoue, Seiki; Tsubota, Motohiko; Fuseya, Yoshiharu; Adachi, Keiichi; and Shishido, Tadao, 4,032,349.
Fujikawa, Tetsuzo; and Misawa, Kichiji, to Kawasaki Jukogyo Kabushiki Kaisha. Engine lubricating oil pump. 4,031,877, Cl. 123-195.00A.
Fujitsu Ltd.: *See—*
Inaba, Seiuemon; Shimizu, Kanryo; Ito, Kohei; Amemiya, Youichi; and Gamo, Gotaro, 4,031,811.
Togei, Ryoiku; Takei, Akira; and Wada, Kunihiko, 4,031,608.
Wakatsuki, Yuzo; Miyake, Masanobu; and Hano, Kazuyuki, 4,032,946.
Fujiwara, Hiroshi; Takahashi, Asao; and Miyamoto, Motomu, to Maruzen Oil Co. Ltd. Process of producing alkenylphenol polymers. 4,032,513, Cl. 260-47.0UA.
Fujiwara, Hiroshi; Takahashi, Asao; and Suzuki, Ken, to Maruzen Oil Co. Ltd. Process for purifying halogenated alkenylphenol polymers. 4,032,598, Cl. 260-878.00R.
Fukui, Osamu: *See—*
Ogihara, Sadahide; Nakamura, Yoichi; and Fukui, Osamu, 4,032,592.
Fukumoto, Mikio: *See—*
Kato, Shozo; Takahashi, Yutaka; Miyaji, Yorio; Kondo, Naomitsu; and Fukumoto, Mikio, 4,032,020.
Fukuoka, Tatsuo. Method of manufacturing a footwear. 4,032,611, Cl. 264-244.000.
Fulkerson, David E., to Honeywell Inc. Logic dot-and gate circuits. 4,032,796, Cl. 307-218.000.
Fulkerson, David E., to Honeywell Inc. Electromagnetic radiation intensity comparator apparatus. 4,032,801, Cl. 307-311.000.
Funk, Richard J. Measuring closure for containers. 4,032,050, Cl. 222-284.000.
Funstuf, Inc.: *See—*
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Furuta, Isao; Iwamoto, Shinsuke; Kuga, Hironari; and Chikatsu, Yoshishige, to Japan Synthetic Rubber Co., Ltd.; and Iwamoto Seisakusho Company Limited. Automatic tensile test apparatus. 4,031,746, Cl. 73-95.000.
Furutachi, Nobuo; Nakamura, Kotaro; Yamada, Minoru; and Arai, Atsuaki, to Fuji Photo Film Co., Ltd. Silver halide emulsion containing two-equivalent magenta coupler. 4,032,346, Cl. 96-56.500.
Fuseya, Yoshiharu: *See—*
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Futaki, Kiyoshi: *See—*
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G. D. Searle & Co.: *See—*
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Jiu, James; and Marsheck, William J., 4,032,408.
GAF Corporation: *See—*
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Lu, Shau-Zou; and Nowicki, Henry, 4,031,912.
Galantay, Eugene E., to Sandoz, Inc. Anti-inflammatory 1-phenyl-2,3-butadien-1-ols, methods of use and compositions containing same. 4,032,580, Cl. 260-618.00D.
Gallas, John D.: *See—*
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Galvin, Aaron A.; Edson, James B.; and Bean, James O. C., to American District Telegraph Company. Intrusion alarm cable supervision system. 4,032,916, Cl. 340-409.000.
Gamo, Gotaro: *See—*
Inaba, Seiuemon; Shimizu, Kanryo; Ito, Kohei; Amemiya, Youichi; and Gamo, Gotaro, 4,031,811.
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Gange, Robert Allen, to RCA Corporation. Holographic recording medium employing a photoconductive layer and a low molecular weight microcrystalline polymeric layer. 4,032,338, Cl. 96-1.500.
Gansser, Robert E.: *See—*
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Gant, Orland J., Jr.: *See—*
Howell, Eddie P.; and Gant, Orland J., Jr., 4,032,194.
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Gardenia Limited: *See—*
Loose, Peter William; and Tamkin, Martyn Ridley, 4,031,821.
Gardiner, John Brooke: *See—*
Song, Won R.; Gardiner, John Brooke; and Engel, Lawrence James, 4,032,700.
Garrett, Thomas Aubrey. Toggle clamp for stringing compound bow. 4,032,111, Cl. 254-77.000.
Gas Council, The: *See—*
Banks, Reginald George Sinclair, 4,032,556.
Gas-Fired Products, Inc.: *See—*
MacIntosh, Frank W., 4,032,023.
Gasior, Joseph, to Midland-Ross Corporation. Hot pellet transfer apparatus. 4,032,271, Cl. 425-10.000.
Gaudard, Yves, to Rhone-Poulenc-Textile. Process for extending the seasonal useful life of ski trails and ski trails produced thereby. 4,032,139, Cl. 272-56.5SS.
Gautier, Franklyn P.: *See—*
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Gay, Walter A., to Olin Corporation. Bis(3,5-difluorosalicylaldehyde)ethylenediimine-Co^{II} compound and use. 4,032,617, Cl. 423-219.000.
Gebr. Hofmann KG: *See—*
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Geistert, Walter: *See—*
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Gembitsky, Petr Alexandrovich: *See—*
Zhuk, David Solomonovich; Gembitsky, Petr Alexandrovich; and Chmarin, Anatoly Ivanovich, 4,032,480.

Gemmell, Frank S.; and Fried, Mark A., to Motorola, Inc. Detonation system and method. 4,031,826, Cl. 102-20.000.
General Atomic Company: *See—*
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General Cable Corporation: *See—*
Eager, George S., Jr.; and Riley, David W., 4,032,381.
General Computing Corporation: *See—*
Shipman, Matthew; Hess, Richard; Kaufman, Burton; and Schneider, Bruce H., 4,032,230.
General Electric Company: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 4,032,364.
Anthony, Thomas R.; and Cline, Harvey E., 4,032,955.
Anthony, Thomas R.; and Cline, Harvey E., 4,032,960.
Baliga, B. Jayant; Houston, Douglas E.; and Krishna, Surinder, 4,032,961.
Bennett, James G.; and Cooper, Glenn D., 4,032,512.
Boldebuck, Edith M.; and Joynson, Catherine W., 4,032,420.
Cline, Harvey E.; Anthony, Thomas R.; Kokosa, Richard A.; and Wolley, E. Duane, 4,031,607.
Cline, Harvey E.; and Anthony, Thomas R., 4,032,965.
Dubin, Robert R.; and Roth, Walter L., 4,032,694.
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Engeler, William E.; and Tiemann, Jerome J., 4,032,948.
Ericson, Eric Axel; and Kaufhold, Frederick Daniel, 4,032,207.
Frazar, Joseph H., 4,031,911.
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Kudlacik, Henry W.; and Winchester, Robert L., 4,032,874.
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Mark, Victor, 4,032,506.
McCarty, William J., 4,031,745.
Milkovic, Miran, 4,032,798.
Oppel, John A.; and Phillips, Virgel E., 4,032,870.
Richter, Eike, 4,032,807.
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General Electric Company Limited, The: *See—*
Connolly, David Charles Antony; and Stevenson, Robert Andrew, 4,032,722.
General Mills, Inc.: *See—*
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General Research of Electronics, Inc.: *See—*
Imazeki, Kazuyoshi, 4,032,844.
Genge, Ulrich; and Eutenereu, Manfred, to Demag Aktiengesellschaft. Apparatus for distribution of charge material in shaft furnaces, particularly high pressure blast furnaces. 4,032,024, Cl. 214-35.00R.
Gentry, Robert Ray, to Union Carbide Corporation. Liquid siloxanes as additives for curable polyester moulding compositions containing vinyl acetate polymer and unsaturated monomer. 4,032,494, Cl. 260-29.1SB.
Georgia, Edward J.; Eggers, Russell K. H.; and Molnar, Ernest L., to Zedron, Inc. Unitary tire-wheel. 4,031,937, Cl. 152-9.000.
Georgiev, Tzvetan Obretenov: *See—*
Hadjiiliev, Ruscho Panayotov; Todorova, Maria Ivanova; Georgiev, Tzvetan Obretenov; Naydenov, Kubrat Vassilev; Jechev, Dinko Mihaylov; Staneva, Yanka Bogdanova; and Hadjiilieva, Irina Valcheva, 4,032,356.
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Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, to Hoffmann-La Roche Inc. Dibenz[b,f]oxepin derivatives. 4,032,525, Cl. 260-268.0TR.
Gerlach, John N., to Kennecott Copper Corporation. Process for conserving quinolic compounds in an organic extractant copper recovery system. 4,032,331, Cl. 75-108.000.
Gerlach, John N., to Kennecott Copper Corporation. Process for increasing the rate of copper metal production in a quinolic extraction system. 4,032,332, Cl. 75-108.000.
Ghyselen, Karel I.: *See—*
De Visser, Erik V. M.; and Ghyselen, Karel I., 4,032,449.
Gibbons, Loren Kenneth, to FMC Corporation. N,N-dialkyl-N'-(substituted-5-isothioazolyl)-N'-acylureas as herbicides. 4,032,321, Cl. 71-90.000.
Gibbons, Loren Kenneth. Isothiazolylformamidine derivatives as herbicides. 4,032,322, Cl. 71-90.000.
Gibson, Preston H. Portable traffic signal. 4,032,883, Cl. 340-41.00A.
Giggard, Earl D., to Continental Group, Inc., The. Barrier bag assembly for aerosol container. 4,032,064, Cl. 229-55.000.
Gigliotti, Michael F. X., Jr.; and Greskovich, Charles D., to General Electric Company. Process for making ceramic molds having a metal oxide barrier for casting and directional solidification of superalloys. 4,031,945, Cl. 164-72.000.
Gilbride, Andrew John; and Martin, John Frederick, to USM Corporation. Device for clamping the workpiece in a sewing machine. 4,031,835, Cl. 112-76.000.
Gilfillen, Lester Ray; Shipley, Edward Nicholas; and Zies, Ray Keith, to Bell Telephone Laboratories, Incorporated. Arrangement for controlling seizure of a connector. 4,032,890, Cl. 340-147.00C.
Gillette Company, The: *See—*
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Pomfret, Edward E., 4,031,620.
Ginggen, Serge R.: *See—*
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Gioia, Norman F.: *See—*
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Gipe, Richard Earl, to GTE Sylvania Incorporated. Method of making two-piece electrical contact. 4,031,614, Cl. 29-630.00A.
Girling Limited: *See—*
Farr, Glyn Phillip Reginald, 4,032,200.
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Gitlitz, Melvin H.: *See—*
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Glay, Guy: *See—*
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Glitz, Ekkehard, to Licentia Patent-Verwaltungs-GmbH. Production of pseudo-random binary signal sequences. 4,032,763, Cl. 235-152.000.
Globus, Alfred R., to Guardian Chemical Corporation. Oil and gasoline fire extinguishing composition. 4,031,961, Cl. 169-47.000.
Gloxhuber, Christian: *See—*
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Gluck, Maternus: *See—*
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Gnedov, Adolf Alexeevich: *See—*
Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich, 4,032,076.
Gobel, Wilhelm: *See—*
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Gobin, Donald L., to Roper Corporation. Mower assembly with catcher securement. 4,031,694, Cl. 56-202.000.
Gobran, Ramsis, to Minnesota Mining and Manufacturing Company. Adhesives tackified with phenol-diene-olefin adducts having number average molecular weight between about 600 to 6000. 4,032,486, Cl. 260-4.0AR.
Goddard, Steven Jerome, to Du Pont de Nemours, E. I., and Company. Herbicidal 2-substituted aryl-4,5,6,7-tetrahydro-2H-isoindole-1,3-diones. 4,032,326, Cl. 71-96.000.
Gogerty, John H.: *See—*
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Golbeck, Bernard J.; Lewandowski, Raymond F.; and Kennedy, Maurice E., to Oak Industries Inc. Rotary switch having a stator with a conductive matrix. 4,032,730, Cl. 200-11.0DA.
Goldner, Heinz-Dieter, to Hartmann & Braun Aktiengesellschaft. Drift compensated amplifier, particularly for measuring signals. 4,032,856, Cl. 330-69.000.
Goldsmith, Raymond W.: *See—*
Alfeis, Franz J.; and Goldsmith, Raymond W., 4,032,393.
Goldsworthy, William B.; and Karlson, Harald E., to McDonnell Douglas Corporation. Fiber insertion device for continuous 3D foaming machine and method. 4,032,383, Cl. 156-79.000.
Gomes, Gilbert S.: *See—*
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Goossens, Bertus: *See—*
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Gorbunova, Ljubov Yakovlevna: *See—*
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Gorden, Dale I.: *See—*
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Gorwara, Ashok K.: *See—*
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Goshima, Takeshi, to Canon Kabushiki Kaisha. High density optical recording apparatus. 4,032,927, Cl. 346-108.000.
Goshima, Yoshitomo: *See—*
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Goss, Paul Thieman. Macrame loom. 4,032,179, Cl. 289-18.000.
Goto, Tateo: *See—*
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Goudriaan, Frans; and Kwant, Pieter B., to Shell Oil Company. Process for the fluoriding of a catalyst. 4,032,474, Cl. 252-441.000.
Graetz, Adan. Collector for amniotic fluid. 4,031,897, Cl. 128-286.000.
Graf, Wilfried, to O & K Orenstein & Koppel Aktiengesellschaft. Mobile crane with means for equalizing the axle load. 4,032,016, Cl. 212-49.000.
Gramor Machine Company: *See—*
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Grange, Raymond A., to United States Steel Corporation. Intercritical-cycle annealing. 4,032,368, Cl. 148-134.000.

Granges Aktiebolag: *See—*
Josefsson, Erik Anders Ake, 4,032,333.

Granges Essem Aktiebolag Fack: *See—*
Eriksson, Hans Georg; Sjoberg, Karl Gosta; and Lofgren, Karl Borje, 4,032,361.

Graser, Earl J.; and Wilson, Jerry F., to Olinkraft, Inc. Two-bottle basket carrier. 4,032,007, Cl. 206-173.000.

Gratzel, Michael, to Hahn-Meitner-Institut fur Kernforschung Berlin GmbH. Method of enhancing the electron yield during photoionization of a sensibilizer. 4,032,477, Cl. 252-501.000.

Gray, James R. Insect trap. 4,031,654, Cl. 43-114.000.

Green, Donald T.; and de Benedetti, Edward, to United States Steel Corporation. Tire inspection machine presenting an X-ray image of the entire width of the tire. 4,032,785, Cl. 250-358.00T.

Green, Sam J.; and Callahan, Richard E., to Champion Spark Plug Company. Spark plug tester ignition system. 4,032,842, Cl. 324-15.000.

Greenstein, Bernard, to Owens-Illinois, Inc. Printing paste vehicle, gold dispensing paste and method of using the paste in the manufacture of microelectronic circuitry components. 4,032,350, Cl. 106-1.000.

Greenwald, Richard B., to Polaroid Corporation. 1,3-Disulfonylcycloalkane. 4,032,538, Cl. 260-327.00M.

Greenwald, Robert J. Fecal examination device. 4,032,437, Cl. 209-17.000.

Gregory, Harold; and Preston, Beryl Margaret, to Imperial Chemical Industries Limited. Polypeptides. 4,032,633, Cl. 424-177.000.

Gregory, Jack T. Manual, hydraulically operated tool. 4,031,619, Cl. 30-180.000.

Greis, Ulrich: *See—*
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Greskovich, Charles D.: *See—*
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Gretler, Heinrich, to Bauer Kaba AG. Emergency key mechanism on a cylinder lock with a double locking cylinder. 4,031,729, Cl. 70-380.000.

Grigoletti, Giorgio, to Ing. C. Olivetti & C., S.p.A. Interface control unit for transferring sets of characters between a peripheral unit and a computer memory. 4,032,898, Cl. 364-200.000.

Grimm, Frank W.: *See—*
Di Michele, Aldo; Gallas, John D.; and Grimm, Frank W., 4,032,880.

Grinberg, Jan; Fraas, Lewis M.; Bleha, William P., Jr.; and Braatz, Paul O., to Hughes Aircraft Company. Silicon single crystal charge storage diode. 4,032,954, Cl. 357-30.000.

Grise, Frederick Gerard Joseph; and Lovell, Walter Carl. Machine for making can ends having rupturable closures. 4,031,836, Cl. 113-1.00F.

Griss, Peter: *See—*
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Gritskov, Ivan Viktorovich; Butyagin, Pavel Anatolievich; Shimko, Ivan Gavrilovich; Mogilevsky, Evsei Moiseevich; Baksheev, Igor Petrovich; Finger, Georgy Georgievich; Scherbakova, Ljudmila Sergeevna; Butkova, Nina Timofeevna; and Kaller, Lev Grigorievich. Apparatus for spinning artificial filament. 4,032,273, Cl. 425-67.000.

Gritzner, Verne B.; and Hackett, Donald W., to United States of America, Energy Research and Development Administration. Mold with improved core for metal casting operation. 4,032,105, Cl. 249-134.000.

Groner, Carl F., to Eastman Kodak Company. Photoimmobilized electrophoretic recording. 4,032,226, Cl. 355-3.00P.

Gross, Thomas A. O., to Gillette Company, The. Transformer circuit. 4,032,836, Cl. 323-6.000.

Grosseau, Albert, to Societe Anonyme Automobiles Citroen. Transmission devices for motor vehicles. 4,031,977, Cl. 180-77.00R.

Groves, William G.; Loev, Bernard; and Perchonock, Carl D., to SmithKline Corporation. Aromatic prostaglandin derivatives. 4,032,656, Cl. 424-308.000.

Groznykh, Rene: *See—*
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Gruodis, Algirdas Joseph: *See—*
Balyoz, John; Gruodis, Algirdas Joseph; Jen, Teh-Sen; and Mikhail, Wadie Faltas, 4,032,962.

Grushkin, Bernard; Forest, Edward; and Carreira, Leonard M., to Xerox Corporation. Photosensitive composition containing vanadyl phthalocyanine for photoelectrophoretic imaging systems. 4,032,339, Cl. 96-1.500.

GTE Laboratories Incorporated: *See—*
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GTE Sylvania Incorporated: *See—*
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Gipe, Richard Earl, 4,031,614.
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Guegel, Gerd: *See—*
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Guha, Prodyot: *See—*
Richardson, William Henry; and Guha, Prodyot, 4,032,367.

Guidoni, Christian. Brassiere adjustable in height, in particular for bathing suits. 4,031,900, Cl. 128-493.000.

Guldager Electrolyse International & Cie: *See—*
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Gulf Oil Corporation: *See—*
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Gulf Research & Development Company: *See—*
Bacha, John D.; and Matthews, Joseph S., 4,032,547.
Cronauer, Donald C.; and Kehl, William L., 4,032,429.
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Onopchenko, Anatoli; and Schulz, Johann G. D., 4,032,569.
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Gund, Heinz K.: *See—*
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Gunneman, Paul, to Ruti-Te Strake B.V. Storing means for forming loop-shaped yarn lengths in a textile machine. 4,031,928, Cl. 139-452.000.

Gurgens, Rainer Eberhard; and Schottle, Helmut August Michael, to Pitney-Bowes, Inc. Electronic embossing machine. 4,031,993, Cl. 197-6.600.

Gutleber, Frank S., to United States of America, Army. Adaptive trunk data transmission system. 4,032,884, Cl. 340-146.10E.

Guyer, Nathan E., to American Biltrite Inc. Spliced belting. 4,031,767, Cl. 74-231.00J.

Guzy, Raymond L.: *See—*
Sheth, Rajesh N.; and Guzy, Raymond L., 4,032,270.

Gwyn, John E.: *See—*
Parker, Wesley A.; Gwyn, John E.; and McCullough, Glenn R., 4,032,300.

Gysel, Ulrich H.; and Gorwara, Ashok K., to United States of America, Navy. Planar balanced mixer/converter for broadband applications. 4,032,849, Cl. 325-446.000.

H. B. Fuller Company: *See—*
Englund, Paul A.; and Collins, James A., 4,032,492.

Haag, Albrecht; and Stechmann, Helmut, to Kienzle Uhrenfabriken GmbH. Electronic digital clocks. 4,031,693, Cl. 58-33.000.

Haas, Werner E. L.; and Dir, Gary A., to Xerox Corporation. Recorded magnetic member viewing apparatus. 4,032,980, Cl. 360-56.000.

Habara, Yasuhiko: *See—*
Yamazaki, Nobuo; Ito, Takeshi; Katsurada, Tetsuro; and Habara, Yasuhiko, 4,031,700.

Hackett, Donald W.: *See—*
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Haddad, Richard Y., to Haddad and Brooks, Inc. Closed system for testing the condition of well bore formations. 4,031,751, Cl. 73-155.000.

Hadden, Stephen Clow: *See—*
Hulls, Leonard Robin; and Hadden, Stephen Clow, 4,032,852.

Hadjiiliev, Ruscho Panayotov; Todorova, Maria Ivanova; Georgiev, Tzvetan Obretenov; Naydenov, Kubrat Vassilev; Jechev, Dinko Mihaylov; Staneva, Yanka Bogdanova; and Hadjiilieva, Irina Valcheva, to Mnipki "Minprojekt". Composition for preventing adhesion of damp earth on metal surfaces. 4,032,356, Cl. 106-287.00R.

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Haferkamp, Dirk: *See—*
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Haffer, Gregor: *See—*
Eder, Ulrich; Sauer, Gerhard; Haffer, Gregor; Ruppert, Jurgen; and Wiechert, Rudolf, 4,032,540.

Haflinger, Dan Joseph, to Stromberg Datagraphix Inc. Collimated beam electron gun system for shaped beam cathode ray tube. 4,032,815, Cl. 315-14.000.

Hagelberg, Anders Torvald Sverker, to Bengt Petersson New Products Investment AB. Cleaning device preferably for water closets. 4,031,673, Cl. 51-385.000.

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Haker, Floyd H. Money transfer device keyboard terminal. 4,032,931, Cl. 340-365.00R.

Hale, George Robert. Data recording instrument. 4,032,926, Cl. 346-79.000.

Hale, Robert R., to Solitron Devices, Inc. Input buffer. 4,032,795, Cl. 307-205.000.

Hall, George H. Crown cutting wire. 4,031,878, Cl. 125-21.000.

Hall, Randall C., to Purdue Research Foundation. Electrolytic conductivity detector system. 4,032,296, Cl. 23-253.0PC.

Halliday & Co., Inc.: *See—*
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Halliday, Richard L.: *See—*
Halliday, Richard L., Jr.; Anderson, Robert R.; and Halliday, Richard L., 4,032,773.

Halliday, Richard L., Jr.; Anderson, Robert R.; and Halliday, Richard L., to Halliday & Co., Inc. Flashlight. 4,032,773, Cl. 240-10.60R.

Hallock, Robert L., to E. S. Products. Hollow sheet metal nail. 4,031,802, Cl. 85-11.000.

Hamanishi, Makio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation system of a motor vehicle. 4,031,871, Cl. 123-119.00A.

Hamburg, Glenn W., to Teledyne Industries, Inc. Bearing assembly with lubrication and cooling means. 4,032,198, Cl. 308-76.000.

Hamey, Peter Michael: *See—*
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Hamilton, William B.: *See—*
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Hanaoka, Masanori; and Inagaki, Masao, to Toyota Jidosha Kogyo Kabushiki Kaisha. Thermostat valve. 4,032,067, Cl. 236-34.500.

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Hansen, Carlo J.: *See—*
Miller, Timothy Allen; and Hansen, Carlo J., 4,032,665.

Hanson, Raymond A. Slipforming method and apparatus for in situ lining of an upwardly open shaft with monolithic concrete. 4,031,708, Cl. 61-41.00R.

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Harada, Yurifumi: *See—*
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Hardegger, Oskar: *See—*
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Harding, George W., to Poly San Corporation. Chemical toilet cabana shell section. 4,031,572, Cl. 4-111.000.

Harding, John Patrick; Butler, David Sydney; and Whitehead, Graham Keith, to Post Office, The. Apparatus for joining wires. 4,031,735, Cl. 72-394.000.

Hardtmann, Goetz E., to Sandoz, Inc. 1,4-Substituted-quinolin-2(1H)-ones as CNS agents. 4,032,528, Cl. 260-289.00R.

Hargis, Robert Norman, to Motorola, Inc. Automatic frequency control system. 4,032,858, Cl. 331-9.000.

Haring, Robert E.: *See—*
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Harmon, Clarence R.: *See—*
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Harper, Jon J.; Navarrete, Antonio E.; and Thomas, Richard J., to Standard Oil Company. Process for the recovery of high purity diesters of terephthalic or isophthalic acids. 4,032,563, Cl. 260-475.00R.

Harrington, Brian Mervyn. Stock handling device. 4,031,858, Cl. 119-103.000.

Harris Corporation: *See—*
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Miaskoff, Leonard, 4,031,793.
Pan, Jing Jong; and Arnold, Milton Phillip, 4,032,802.
Richmond, Abraham W., 4,032,817.

Harrison, Anthony William, to Girling Limited. Brake actuator and thrust receiving structure. 4,031,984, Cl. 188-59.000.

Hartman, Donald W.; Armstrong, Donald E.; and Audesse, Emery G., to GTE Sylvania Incorporated. Photoflash lamp array with web hinge. 4,032,769, Cl. 240-1.300.

Hartman, Seymour, to Champion International Corporation. Manufacture of polyurethanes from bark. 4,032,483, Cl. 260-2.5AM.

Hartmann & Braun Aktiengesellschaft: *See—*
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Hassler, Heinrich; Kippenberg, Horst; and Schreiner, Horst, to Siemens Aktiengesellschaft. Composite metal as a contact material for vacuum switches. 4,032,301, Cl. 428-567.000.

Hatsukano, Yoshikazu: *See—*
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Hawaiian Sugar Planters' Association: *See—*
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Haynes, William P., to GTE Laboratories Incorporated. Positive feedback high gain AGC amplifier. 4,032,973, Cl. 358-176.000.

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Hegarty, Charles Paul; and Pietryk, Helen C., to American Home Products Corporation. Method of viral chemoprophylaxis. 4,032,659, Cl. 424-323.000.

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Heimann, Werner. Extraction forceps for upper molars. 4,031,624, Cl. 32-62.000.

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Heins, Arnold; Moller, Hinrich; and Osberghaus, Rainer, to Henkel & Cie G.m.b.H. N-polyhydroxyalkyl-amino acids, their manufacture and skin treating agents containing the same. 4,032,676, Cl. 424-273.000.

Heinz, Robert F. Reinforcing cage construction. 4,031,685, Cl. 52-653.000.

Helder, Johan; Holzinger, Karl; Guegel, Gerd; Liebler, Heinz; and Pernegger, Wolfgang, to Siemens Aktiengesellschaft. Electroplating device and method for the partial plating of two-row pin strips. 4,032,414, Cl. 204-15.000.

Helena Rubinstein, Inc.: *See—*
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Henderson, Dewey D.; Rogers, Jerry W.; and Hollaway, Gerald C., Jr., to Dayco Corporation. Endless power transmission belt structure. 4,031,768, Cl. 74-233.000.

Henderson, James H., to Permeator Corporation. Method of maintaining the permeability of hydrocarbon reservoir rock. 4,031,959, Cl. 166-307.000.

Hendricks, David Allen; Howe, Milton Albert, Jr.; Luck, Stephen Royall; Morris, Alfred Ray; and Owen, Dave Leslie, to W. R. Grace & Co. Device, apparatus and process for dispensing taped bags. 4,032,038, Cl. 221-71.000.

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Hendrix, Arnold P.: *See—*
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Henley, Michael Lee; and Smith, Lawrence Edward, to RCA Corporation. Raster centering circuit. 4,032,819, Cl. 315-398.000.

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Henzel, Daniel Georges Christian, to Institut National de la Sante et de la Recherche Medicale. Apparatus for correlating the respiratory and cardiac cycles. 4,031,884, Cl. 128-2.05R.

Herbert, Gerald P.; McGinn, Ferdinand M.; and Embree, Hugh D., to Production Specialties, Inc. Flow valve installation and removal apparatus. 4,031,954, Cl. 166-117.500.

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Hibbs, Eugene B., Jr. Overdrive detector for radio frequency amplifier. 4,032,853, Cl. 330-2.000.

Hild, Danny L. Detachable conveyor bucket apparatus. 4,032,001, Cl. 198-711.000.

Hill, David John. Stall control and wear block for recreational skate boards. 4,031,988, Cl. 188-250.00B.

Hill, Joseph Caldwell, to Varian Associates. Coaxial balun with doubly balanced heterodyne converter. 4,032,850, Cl. 325-446.000.

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Hirade, Kenkichi; Hattori, Takeshi; and Wasai, Hiromi, to Nippon Telegraph and Telephone Public Corporation. Digital mobile communication system and method. 4,032,846, Cl. 325-54.000.

Hirt, Peter Klaus; and Switzeny, Kurt, to Pohlig-Heckel-Bleichert Vereinigte Maschinenfabriken Aktiengesellschaft. Safety clamping device for pull-cable in aerial cableway arrangement. 4,031,830, Cl. 104-223.000.

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Hooper, Richard G., to United States of America, Air Force. Total water content instrument. 4,031,753, Cl. 73-170.00R.

Hoots, Robert G. Fuel atomizer. 4,031,876, Cl. 123-141.000.

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Hoover, Fred Wayne; and Roberts, Robert Earl, to Du Pont de Nemours, E. I., and Company. Permselective membrane apparatus with porous support. 4,032,454, Cl. 210-323.00R.

Hoover, Merle Vincent, to RCA Corporation. Complementary symmetry FET mixer circuits. 4,032,851, Cl. 325-451.000.

Hoppe, Alfred; and Geistert, Walter, to Deutsche Texaco Aktiengesellschaft. Process for optimal pressure control in a multi-stage evaporation unit. 4,032,412, Cl. 203-22.000.

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Howell, Eddie P.; and Gant, Orland J., Jr., to Atlantic Richfield Company. Method for the production of minerals. 4,032,194, Cl. 299-4.000.
Hubbard, James H.; and Van Cleave, George W., to International Business Machines Corporation. Toner concentration control apparatus. 4,032,227, Cl. 355-14.000.
Huchital, David A.; and Steinberg, George N., to Perkin-Elmer Corporation, The. High power electrodeless gas arc lamp for pumping lasers. 4,032,862, Cl. 331-94.50P.
Hudault, Gerard: *See—*
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Huff, Bernice, to Procter & Gamble Company, The. Legless panty. 4,031,568, Cl. 2-406.000.
Hughes Aircraft Company: *See—*
Grinberg, Jan; Fraas, Lewis M.; Bleha, William P., Jr.; and Braatz, Paul O., 4,032,954.
Harp, Robert S.; and Russell, Kenneth J., 4,032,865.
Kamath, G. Sanjiv; and Smith, Bradley W., 4,032,950.
Koda, Nobuo John, 4,032,783.
Hughes, John, to American Colloid Company. Continuous method for producing a dry, solid polyacrylamide. 4,032,701, Cl. 526-88.000.
Hughes, Lee E.; Marshall, John L.; and Doring, Dieter, to Tally Corporation. Wide range current flow fault detector. 4,032,766, Cl. 235-153.0AS.
Hugon, Pierre: *See—*
Beregi, Laszlo; Hugon, Pierre; Duhault, Jacques; and Boulanger, Michelle, 4,032,658.
Huhse, Peter; Marin, Heiner; Kurzmann, Harald; and Henry, Marion, to Siemens Aktiengesellschaft. Contact system for high-voltage power circuit breakers. 4,032,737, Cl. 200-148.00R.
Hull, James S., to Melvin Corporation. Hydrostatic conveyor drive. 4,032,003, Cl. 198-855.000.
Hulls, Leonard Robin; and Hadden, Stephen Clow, to RCA Corporation. Filter which tracks changing frequency of input signal. 4,032,852, Cl. 328-167.000.
Humberger, Roger Benton: *See—*
Smith, Jack Lee; Crowley, Charles Raymond; and Humberger, Roger Benton, 4,032,319.
Humphrey, John M.; and Holzman, Allen L., to United States of America, Navy. Split flow injector for solid fuel ramjets. 4,031,698, Cl. 60-251.000.
Hung, Ling Kong: *See—*
Bloom, Allen; and Hung, Ling Kong, 4,032,470.
Hunter, John David: *See—*
Hollway, David Lipscombe; Somlo, Peter Ivan; Hunter, John David; and Morgan, Idris Gareth, 4,032,910.
Huntley, James R.; and Southard, William Franklin, to Tool Service Engineering Company. Device for assembling picture frames. 4,032,130, Cl. 269-8.000.
Hurd, Frank W., to University of Minnesota, Inc. Metal reduction process. 4,032,328, Cl. 75-84.10R.
Hurd, Frank W., to University of Minnesota, Inc. Metal reduction process employing metal sub-halides. 4,032,329, Cl. 75-84.500.
Hurko, Bohdan, to General Electric Company. Flat plate heating unit with foil heating means. 4,032,750, Cl. 219-464.000.
Hurschman, Alfred A., to Ampoules Corporation. Two-chamber mixing syringe. 4,031,892, Cl. 128-218.00M.
Hurt, John M., Jr. Card grading system. 4,031,636, Cl. 35-48.00A.
Husky Corporation: *See—*
Sutcliffe, Grenville G.; and Dumpis, Janis, 4,031,930.
Hussain, Amir, to Siemens Aktiengesellschaft. Producing glass fiber containing epoxy resin adhesive films. 4,032,358, Cl. 106-311.000.
Hutchinson, Florence M., executrix: *See—*
Hutchinson, William Milton, deceased, 4,032,467.
Hutchinson, William Milton, deceased (by Hutchinson, Florence M., executrix), to Phillips Petroleum Company. Azeotropes of 1,2-dichloro-1,1,2-trifluoroethane. 4,032,467, Cl. 252-162.000.
Hyde, Robert W. Method of forming art product. 4,032,671, Cl. 427-14.000.
Hydro-Tech Corporation: *See—*
Onal, Hasan F.; and Harmon, Clarence R., 4,031,844.
Hydro, William R., to United States of America, Army. Piperidine derivatives. 4,032,531, Cl. 260-293.640.
I.W.S. Nominee Company Limited: *See—*
Kilpatrick, David John; Shaw, Trevor; and Lewis, David Malcolm, 4,032,565.
Ibamoto, Masahiko; and Kiwaki, Hisakatsu, to Hitachi, Ltd. Chopper control device. 4,032,833, Cl. 363-78.000.
Ibanez, Cuitlahuac, to Tecnicas de Riego y Abono, S.A. Injection irrigating process and apparatus. 4,031,833, Cl. 111-7.100.
Ichi, Tomoyuki: *See—*
Irie, Toshio; Tanda, Toshikuni; Ichi, Tomoyuki; and Sadayori, Toshio, 4,032,675.
Ichioka, Eiji; and Harada, Yurifumi, to Ashimori Kogyo Kabushiki Kaisha. Method of forming a coating of a rubber or a synthetic resin having an even thickness on the external surface of a tubular textile jacket. 4,032,677, Cl. 427-358.000.
IDR, Inc.: *See—*
Saylor, Richard, 4,032,972.
Ignoffo, Vincent E. Muffler and exhaust gas purifier for internal combustion engines. 4,032,310, Cl. 55-276.000.
Iida, Noriyoshi: *See—*
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Iida, Yoshihisa; and Oike, Yozo, to Shinpo Kogyo Kabushiki Kaisha. Speed reduction gear. 4,031,781, Cl. 74-804.000.
Iimura, Kamizo: *See—*
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IFT Research Institute: *See—*
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Iizuka, Nobuyuki; Otawara, Yasuhiko; and Ninomiya, Satoshi, to Hitachi, Ltd. Turbine rotor holding device. 4,032,255, Cl. 415-219.00R.
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, to Tanabe Seiyaku Co., Ltd. Benzylalcohol amine derivatives. 4,032,575, Cl. 260-570.600.
Illinois Tool Works Inc.: *See—*
Curtis, Gary Martin, 4,031,936.
Edwards, Bryant, 4,031,832.
Mittelmann, Eugene, 4,032,740.
Ilzig, Karl F., to Original Hanau Quarzlampen GmbH. Surgical operating lamp. 4,032,771, Cl. 240-1.400.
Imai, Hirozo: *See—*
Tanaka, Yoshimasa; Imai, Hirozo; Tsutsumi, Tadao; and Oda, Takeshi, 4,031,617.
Imazeki, Kazuyoshi, to General Research of Electronics, Inc. Combination microphone, speaker, and control unit for a radio transceiver. 4,032,844, Cl. 325-15.000.
Imme, Helmut; and Moser, Werner, to SKF Industrial Trading and Development Company B.V. Method for the production of concentric machine elements. 4,031,734, Cl. 72-368.000.
Immordino, Vincent J., to Display Originals, Inc. Clamping-type bracket. 4,032,101, Cl. 248-225.400.
Imoto, Kazuo, to Texas Instruments Incorporated. Thermally responsive valve having dual operating temperatures. 4,032,071, Cl. 236-101.00E.
Imperial Chemical Industries Limited: *See—*
Aldridge, David Cecil; Crawley, Graham Charles; and Strawson, Colin John, 4,032,651.
Burnham, David Robert, 4,032,590.
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Gregory, Harold; and Preston, Beryl Margaret, 4,032,633.
In Situ Technology, Inc.: *See—*
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Inaba, Seiuemon; Shimizu, Kanryo; Ito, Kohei; Amemiya, Youichi; and Gamo, Gotaro, to Fujitsu Ltd. Electro-hydraulic pulse motor. 4,031,811, Cl. 91-39.000.
Inaba, Shigeho: *See—*
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.
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Indian Head Inc.: *See—*
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Ing. C. Olivetti & C., S.p.A.: *See—*
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Grigoletti, Giorgio, 4,032,898.
Lanza, Lucio; and Vecchio, Francesco Giovanni, 4,032,895.
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Inouye, Kozo; Yokota, Yukio; Okumura, Akio; Kubodera, Seiiti; and Shiba, Keisuke, to Fuji Photo Film Co., Ltd. Silver halide materials containing photographic color couplers with isothiocyanato groups. 4,032,345, Cl. 96-55.000.
Inspiration Consolidated Copper Company: *See—*
Fountain, Gerald F.; Veloz, Jaime; Dahlberg, Harry R.; and Bilson, Edward A., 4,032,330.
Institut National de la Sante et de la Recherche Medicale: *See—*
Henzel, Daniel Georges Christian, 4,031,884.
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International Audio Visual, Inc.: *See—*
Matare, Herbert F., 4,032,370.
International Business Machines Corporation: *See—*
Anderson, Kevin Lee; and Arzubi, Luis Maria, 4,032,904.
Arter, Nelson K.; and Jackson, Howard C., 4,032,982.
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Roberts, David C., 4,032,887.
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Vora, Madhukar B., 4,032,372.
Williams, Robert Russell, 4,032,894.
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International Nickel Company, Inc., The: *See—*
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International Paper Company: *See—*
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International Telephone and Telegraph Corporation: *See—*
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Irani, Mazin R., to Stauffer Chemical Company. Stabilized methylene chloride. 4,032,584, Cl. 260-652.50R.

Ireco Chemicals: *See—*
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Irie, Toshio; Tanda, Toshikuni; Ichi, Tomoyuki; and Sadayori, Toshio, to Kawasaki Steel Corporation. Method for producing coated electrical steel sheets having excellent punchability, weldability, electrical insulation and heat resistance. 4,032,675, Cl. 427-126.000.

Ishigaki Kiko Co., Ltd.: *See—*
Iwatani, Akitoshi, 4,032,450.

Ishikawa, Akira: *See—*
Aoki, Motomu; and Ishikawa, Akira, 4,031,642.

Ishikawa, Masaru; and Kumazawa, Akihiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Vibration control bush assembly. 4,032,202, Cl. 308-238.000.

Ishikawa, Shoichi, to Kabushiki Kaisha Hasegawa Haguruma. Dual tooth contact type W-N gear. 4,031,770, Cl. 74-462.000.

Ito, Hiroshi, to Tokico Ltd. Mechanical disc brake. 4,031,985, Cl. 188-71.900.

Ito, Kazuhiro: *See—*
Mori, Mitsuhiro; Ito, Kazuhiro; Morioka, Makoto; and Ono, Yuichi, 4,032,945.

Ito, Kohei: *See—*
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Ito, Nobuo: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,032,575.

Ito, Sakumatsu. Roll feeder device for press works. 4,032,056, Cl. 226-154.000.

Ito, Tadashi; Uchidoi, Masanori; Taguchi, Tetsuya; Tunekawa, Tokuichi; Aizawa, Hiroshi; and Takishima, Yoshiyuki, to Canon Kabushiki Kaisha. Indication system of a camera. 4,032,933, Cl. 354-23.00D.

Ito, Takeshi: *See—*
Yamazaki, Nobuo; Ito, Takeshi; Katsurada, Tetsuro; and Habara, Yasuhiko, 4,031,700.

Itoi, Kazuo: *See—*
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Ivanov, Nikolai Ivanovich: *See—*
Shraiman, Evgenia Isaevna; Shraiman, Isai Beniaminovich; Tsesevich, Eduard Iosifovich; Dobroslavsky, Viktor Leonidovich; Ivanov, Nikolai Ivanovich; and Lebedev, Pavel Pavlovich, 4,031,809.

Ives, Christopher J. M.: *See—*
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Iwamoto Seisakusho Company Limited: *See—*
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Iwamoto, Shinsuke: *See—*
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Iwatani, Akitoshi, to Ishigaki Kiko Co., Ltd. Filter press. 4,032,450, Cl. 210-230.000.

J. & P. B. Myers Inc.: *See—*
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J. P. Stevens & Co., Inc.: *See—*
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J. R. Simplot Company: *See—*
Smith, Jack Lee; Crowley, Charles Raymond; and Humberger, Roger Benton, 4,032,319.

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Jackson, Allen S., to Hollyfield, Clifford G., Jr., a part interest. Self-training idler assembly. 4,032,002, Cl. 198-808.000.

Jackson, Howard C.: *See—*
Arter, Nelson K.; and Jackson, Howard C., 4,032,982.

Jackson, Lewis B., Jr. Condition sampling and indicating system. 4,032,906, Cl. 340-196.000.

Jacob, H. John. Nasal septum plug. 4,031,569, Cl. 3-1.000.

Jacques, Wolfgang: *See—*
Spork, Helmut; Strasser, Rudolf; Riedle, Rudolf; Jacques, Wolfgang; and Waas, Johann, 4,032,557.

Jadot, Jean Pierre: *See—*
Coeure, Philippe; Jadot, Jean Pierre; and Peuzin, Jean Claude, 4,032,217.

Jaffa, David, to Precision Screen Machines Inc. Pallet mounting apparatus for screen printing machines. 4,031,825, Cl. 101-126.000.

Jahnke, Uwe; and Sommer, Friedrich, to U.S. Philips Corporation. Circuit arrangement for phase-alignment of a servo drive for a rotary system. 4,032,826, Cl. 318-314.000.

Jaksim, Stanley: *See—*
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Jallouk, Philip A., to United States of America, Energy Research and Development Administration. Flow directing means for air-cooled transformers. 4,032,873, Cl. 336-57.000.

Jaluria, Yogesh: *See—*
Chu, Tze Yao; Jaluria, Yogesh; Lilienthal, Peter Frederick, II; and Wenger, George Michael, 4,032,033.

James Burn Bindings Limited: *See—*
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James, Kenneth, to Tate & Lyle Limited. Production of surface active material. 4,032,702, Cl. 536-119.000.

Janquart, Jerry C.: *See—*
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Japan Racing Association, The: *See—*
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Japan Synthetic Rubber Co., Ltd.: *See—*
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Japanese National Railways: *See—*
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Jarmofsky, Seymour, deceased; by Jarmofsky, Doris F., legal representative and heir; and by Jarmofsky, Nancy H., heir, to Litton Systems, Inc. Electrical contact for wire and pin with common stop. 4,032,215, Cl. 339-258.00R.

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Jenness, Raymond C., to Allis-Chalmers Corporation. Apparatus for equalizing radial load on plurality of pivoted bearing pads. 4,032,199, Cl. 308-73.000.

Jenny, Christian Jakob; and Kuemmerle, Karl Albert, to International Business Machines Corporation. Apparatus and method for switching of data. 4,032,899, Cl. 364-200.000.

Jensen, Robert Eugene, to Brannan, Leonard M., a part interest. Latching mechanism for rear gate of dump vehicle with automatic tilt release. 4,032,192, Cl. 298-23.00A.

Jess, Thurman S., to Baxter Travenol Laboratories, Inc. Air eliminating filter. 4,031,891, Cl. 128-214.00R.

Jezo, Maurice Leon Jean, to International Telephone and Telegraph Corporation. Tacan-dme identity detector. 4,032,756, Cl. 235-92.0PB.

Jim Dandy Company, The: *See—*
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Johns-Manville Corporation: *See—*
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Johnson, Ben C., Jr., to Thermon Manufacturing Company. Method of making preinsulated pipe assembly. 4,031,611, Cl. 29-611.000.

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Johnson, C. Evan, to Hitachi Magnetics Corporation. Fishing line release mechanism. 4,031,652, Cl. 43-43.120.

Johnson, Carl E.; and Carroll, Kenneth G., to United States of America, Energy Research and Development Administration. Nuclear reactor fuel element with vanadium getter on cladding. 4,032,400, Cl. 176-67.000.

Johnson, David E.; and Polsfuss, Terrance E., to Despatch Industries, Inc. Convection oven. 4,032,289, Cl. 432-200.000.

Johnson, Eugene R.; and Mower, Morris F., to Bliss & Laughlin Ind., Inc. Exterior corner tool. 4,032,283, Cl. 425-458.000.

Johnson, Frederick M.; Brown, James R.; and Reitz, Rex L., to Insulex,

Inc. Construction laminate of plastic foam between paper sheets. 4,032,689, Cl. 428-55.000.
Johnson, George C., to Mobil Oil Corporation. Liquefaction of coal. 4,032,428, Cl. 208-8.000.
Johnson, Kenneth I. Particles sizing. 4,032,436, Cl. 209-1.000.
Johnson, Marilyn M. Nursing garment. 4,031,566, Cl. 2-104.000.
Johnson, Terry R., to United States of America, Energy Research and Development Administration. Method for the safe disposal of alkali metal. 4,032,615, Cl. 423-179.000.
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Jones, Benjamin Bostick; Karrasch, Richard John; and Eitel, Stephen Wallace, to Jim Dandy Company, The. Expansion process for the production of instant grits. 4,032,668, Cl. 426-449.000.
Jones, Claude R., to United States of America, Air Force. Method of, and apparatus for, making visible the flow pattern of a gas. 4,031,759, Cl. 73-432.00R.
Jones, Donald K., to Cluett, Peabody & Co., Inc. Method and apparatus for bleaching and related processing of greige cloth. 4,032,292, Cl. 8-111.000.
Jones, Ferris E. Modular bench seat. 4,032,188, Cl. 297-232.000.
Jones, Lary D.; van Outer, Robert H.; and Kettelson, Ernest S., to Square D Company. Captive fastener assembly. 4,031,935, Cl. 151-41.760.
Jones, Robert D., to Intraco, Inc. Volumetric accumulating device. 4,031,857, Cl. 119-56.00R.
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Jones, Robert J.; and O'Rell, Michael K., to TRW Inc. Bis(benzil) type compounds containing one or two furan moieties. 4,032,546, Cl. 260-347.200.
Jonnes, Nelson, to Minnesota Mining and Manufacturing Company. Porous reflective fabric. 4,032,681, Cl. 428-253.000.
Jordan, Carmel T. Baiting arrangement for rodents. 4,031,653, Cl. 43-61.000.
Jordan, Charles L., to Aluminum Company of America. Method of reforming a can end. 4,031,837, Cl. 113-121.00C.
Josefsson, Erik Anders Ake, to Stora Kopparbergs Bergslags Aktiebolag; and Granges Aktiebolag. Rolled steel materials. 4,032,333, Cl. 75-124.000.
Joy, Herman J., to Cluett, Peabody & Co., Inc. Integrated finishing and compressive preshrinking of a high-shrinkage fabric. 4,031,596, Cl. 26-18.600.
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Joyce, Gordon Charles, to National Research Development Corporation. Apparatus for automatically controlling crystal growth. 4,032,389, Cl. 156-601.000.
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Julesz, Bela, to Bell Telephone Laboratories, Incorporated. Stereoscopic technique for detecting defects in periodic structures. 4,032,237, Cl. 356-237.000.
Jureit, John Calvin; Cotten, Howell J.; Castillo, Adolfo; and Leutwyler, Roy, to Automated Building Components, Inc. Apparatus and methods of fabricating wooden frames panels and the like. 4,031,604, Cl. 29-429.000.
Jureit, John Calvin; and Kushner, Benjamin H., to Automated Building Components, Inc. Connector plate. 4,031,803, Cl. 85-13.000.
K and M Rubber Company: *See—*
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Kabushiki Kaisha Ricoh: *See—*
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Kadija, Igor V., to Olin Corporation. Porous anode separator. 4,032,427, Cl. 204-283.000.
Kaesemeyer, Carl W. Electronic tool gage. 4,031,628, Cl. 33-201.000.
Kahn, William J. Instant scaffold and paint can holder. 4,032,100, Cl. 248-211.000.
Kaiser Aluminum & Chemical Corporation: *See—*
Zinniger, Theodore C.; and Burke, Phillip J., 4,032,608.
Kaiser Glass Fiber Corporation: *See—*
Coggin, Charles H., Jr., 4,032,314.
Kaiser, Jordan Ross. Combined container and viewer package for film transparencies. 4,031,641, Cl. 40-63.00A.
Kale, Howard D. Traps for sinks, laundry tubs and the like. 4,032,455, Cl. 210-435.000.
Kali-Chemie Aktiengesellschaft: *See—*
Bartzsch, Henning, 4,032,469.
Kalinnikov, Semen Arefievich: *See—*
Lebedev, Vladimir Konstantinovich; Troitsky, Vladimir Alexandrovich; and Kalinnikov, Semen Arefievich, 4,032,840.
Kalle Aktiengesellschaft: *See—*
Perthes, Horst, 4,032,232.
Kaller, Lev Grigorievich: *See—*
Gritskov, Ivan Viktorovich; Butyagin, Pavel Anatolievich; Shimko, Ivan Gavrilovich; Mogilevsky, Evsei Moiseevich; Baksheev, Igor Petrovich; Finger, Georgy Georgievich; Scherbakova, Ljudmila Sergeevna; Butkova, Nina Timofeevna; and Kaller, Lev Grigorievich, 4,032,273.
Kaman Aerospace Corporation: *See—*
Flannelly, William G., 4,031,744.
Kamath, G. Sanjiv; and Smith, Bradley W., to Hughes Aircraft Company. Liquid phase epitaxial process for growing semi-insulating GaAs layers. 4,032,950, Cl. 357-17.000.
Kametani, Hiroshi, to National Research Institute for Metals. Electrolytic cell for use in hydroelectrometallurgy. 4,032,425, Cl. 204-261.000.
Kamp, Ewald Albert: *See—*
Troy, Marion Frank; and Kamp, Ewald Albert, 4,032,274.
Kanarr, George W.: *See—*
Mannear, Idabelle K., 4,032,662.
Kanarr, Ruth A.: *See—*
Mannear, Idabelle K., 4,032,662.
Kandel, Thomas G. Process for treating pile materials made into electrophotographic toner removal brushes. 4,032,196, Cl. 300-21.000.
Kaneko, Michio, legal representative: *See—*
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.
Kaneko, Shinichi, deceased (by Kaneko, Michio, legal representative); Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Ortho-acylated anilide derivatives and salts thereof. 4,032,573, Cl. 260-562.00N.
Kanowsky, Vincent C.; and Blanc, Lloyd A., to Allied Upholstery Mfg. Inc. Convertible sofa bed. 4,031,577, Cl. 5-17.000.
Kapfhammer, Wilhelm: *See—*
Deml, Reinhold; Greis, Ulrich; and Kapfhammer, Wilhelm, 4,032,343.
Kaplan, Howard B., to Warwick Electronics Inc. Tone selector circuit with multiplexed tone data transfer. 4,031,786, Cl. 84-1.030.
Kaplan, Jean-Pierre: *See—*
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, 4,032,525.
Kaplan, Sheldon; Calkins, George B.; Sarnoff, Stanley J.; and Dalling, N. Lawrence, to Survival Technology, Inc. Hypodermic injection device having means for varying the medicament capacity thereof. 4,031,893, Cl. 128-218.00F.
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., to Teledyne Industries, Inc. Variable compression ratio piston. 4,031,868, Cl. 123-78.00B.
Karasa, Alvydas Petras; and Markle, Stanley Alan, to Black and Decker Manufacturing Company, The. Chuck key holder. 4,032,160, Cl. 279-1.00K.
Karikawa, Tohru; and Kobayashi, Koichi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Miniature single lens reflex camera. 4,032,938, Cl. 354-155.000.
Karl, Eric, to Sarah's Family, Inc. Removable water tight base for bong. 4,031,904, Cl. 131-173.000.
Karlson, Harald E.: *See—*
Goldsworthy, William B.; and Karlson, Harald E., 4,032,383.
Karrasch, Richard John: *See—*
Jones, Benjamin Bostick; Karrasch, Richard John; and Eitel, Stephen Wallace, 4,032,668.
Karsten, Eugene E.: *See—*
Boyce, William N., 4,032,909.
Kartridg Pak Co., The: *See—*
Roberts, Gary F., 4,032,049.
Kaschuba, Johannes; and Ernst, Manfred, to Bayer Aktiengesellschaft. Production of phosphorus oxy compounds. 4,032,603, Cl. 260-990.000.
Kaser, Jon Bruce; Von Feldt, John Lawrence; and Walenta, Ivan Earl, to Burroughs Corporation. Transducer positioning system for providing both coarse and fine positioning. 4,032,984, Cl. 360-77.000.
Kashio, Toshio, to Casio Computer Co., Ltd. Apparatus for distinguishing heading information from other information in an information processing system. 4,032,900, Cl. 364-200.000.
Kashiwara, Tomokazu: *See—*
Matsui, Kazumi; Umemori, Takashi; Shibata, Yutaka; Yamamura, Kinzo; Kimura, Tamisuke; and Kashiwara, Tomokazu, 4,031,990.
Kassing, Milton O., to Semmelmeyer-Corby Co. Segmented sprocket. 4,031,769, Cl. 74-243.0DR.
Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, to Canon Kabushiki Kaisha. Feed cassette device. 4,032,137, Cl. 271-164.000.
Kato, Shozo; Takahashi, Yutaka; Miyaji, Yorio; Kondo, Naomitsu; and Fukumoto, Mikio, to Sumitomo Chemical Company, Limited; and Kabushiki Kaisha Miyazaki Tekkosho. Article exchanging apparatus. 4,032,020, Cl. 214-1.0BB.

Katsurada, Tetsuro: *See—*
Yamazaki, Nobuo; Ito, Takeshi; Katsurada, Tetsuro; and Habara, Yasuhiko, 4,031,700.
Kaufhold, Frederick Daniel: *See—*
Ericson, Eric Axel; and Kaufhold, Frederick Daniel, 4,032,207.
Kaufman, Burton: *See—*
Shipman, Matthew; Hess, Richard; Kaufman, Burton; and Schneider, Bruce H., 4,032,230.
Kawaguchi, Hiroshi: *See—*
Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, 4,032,404.
Kawai, Minoro; and Muramatsu, Kenji. Box and method of making the same. 4,032,062, Cl. 229-20.000.
Kawanishi, Toshiyuki; and Sohmiya, Norimasa, to Kabushiki Kaisha Ricoh. Liquid developer for use in electrostatic photography and preparation of same. 4,032,463, Cl. 252-62.10L.
Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Fujikawa, Tetsuzo; and Misawa, Kichiji, 4,031,877.
Kawasaki Steel Corporation: *See—*
Irie, Toshio; Tanda, Toshikuni; Ichi, Tomoyuki; and Sadayori, Toshio, 4,032,675.
Kecskemethy, Geza; Tihanyi, Robert; and Virag, Gyorgy, to Muanyagipari Kutato Intezet. Method and control system for batching plural substances and pump system. 4,032,040, Cl. 222-1.000.
Kehl, William L.: *See—*
Cronauer, Donald C.; and Kehl, William L., 4,032,429.
Kehoe, James W., to GAF Corporation. Apparatus for preparing sealed envelope units with messages. 4,031,818, Cl. 93-63.00R.
Keifert, Hibbard G.; and Waters, Frank J., deceased (by Waters, Ethel M., administratrix), to Fansteel Inc. Joint fabrication and method for forming the same. 4,032,243, Cl. 403-272.000.
Keiser, William, to McGraw-Edison Company. Utility distribution console. 4,032,821, Cl. 361-334.000.
Kelchner, Jay Robert, to Hilliard Corporation, The. Plug valve. 4,032,107, Cl. 251-296.000.
Keller, Albert G.; Nix, Donald F.; and Morrison, Howard J., to Marvin Glass & Associates. Toy pick-up vehicle. 4,031,659, Cl. 46-204.000.
Keller, Robert Samuel: *See—*
Peters, Joseph Jerome; Villanueva, Antonio Tong; and Keller, Robert Samuel, 4,032,669.
Kelley, John J., to Raymond Lee Organization, Inc., The, a part interest. Dental floss holder and dispenser. 4,031,909, Cl. 132-91.000.
Kelley, John Sherburne: *See—*
Elliott, Richard Montgomery; Newton, Albert Eugene; and Kelley, John Sherburne, 4,032,046.
Keliy, Robert C., to Upjohn Company, The. 4α,6-Dihydroxy-5-iodo-2β-aryloxymethyl-3α-tetrahydropyranoacetic acid γ-lactone, 6-alkyl ethers. 4,032,542, Cl. 260-343.600.
Kendrick, Gary R.; and Sauder, Robert A., to Sauder Industries, Inc. Stud welding gun and method of operation. 4,032,742, Cl. 219-99.000.
Kennecott Copper Corporation: *See—*
Donaldson, John W.; Sharma, Sheree N.; and Themelis, Nicholas John, 4,032,327.
Gerlach, John N., 4,032,331.
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Kennedy, Maurice E.: *See—*
Golbeck, Bernard J.; Lewandowski, Raymond F.; and Kennedy, Maurice E., 4,032,730.
Kenney, George Churchill; and Hoogendijk, Adrianus Huibert, to U.S. Philips Corporation; and North American Philips Corporation. Drop out compensation device. 4,032,966, Cl. 358-8.000.
Kern, Michael F. Tamperproof lock and method. 4,031,730, Cl. 70-419.000.
Kesel, Guenther; and Losehand, Reinhard, to Siemens Aktiengesellschaft. Controllable charge-coupled semiconductor device. 4,032,947, Cl. 357-24.000.
Keshi, Akizo; Kodama, Katsuhisa; Takemura, Ichiro; Tairaka, Yoshihiko; and Yoshinaga, Kunio, to Takeda Chemical Industries, Ltd. Production of polyetherpolyols useful in preparing rigid polyurethane foams. 4,032,574, Cl. 260-570.00D.
Kettelson, Ernest S.: *See—*
Jones, Lary D.; van Outer, Robert H.; and Kettelson, Ernest S., 4,031,935.
Keuleman, Alexander Hendrich Francis: *See—*
Parkyn, Derek John; and Keuleman, Alexander Hendrich Francis, 4,032,792.
Khachigian, John. Threading attachment for turning machines. 4,031,584, Cl. 10-89.00H.
Khrapchenkov, Oleg Kirillovich: *See—*
Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich, 4,032,076.
Kida, Takao; Mizuno, Hiroshi; and Okutsu, Masaru, to Ajinomoto Co., Inc. Method for controlling weeds with amino acid higher alkyl esters. 4,032,325, Cl. 71-95.000.
Kido, Keishiro; Tsuboi, Masayoshi; and Arai, Noboru, to Fuji Photo Film Co., Ltd. Method for forming phase holograms. 4,032,348, Cl. 96-60.00R.
Kido, Keishiro; Honjo, Satoru; and Sato, Masamichi, to Fuji Photo Film Co., Ltd. Recording material. 4,032,691, Cl. 428-304.000.
Kidoh, Kunizoh; Wakamori, Hideki; and Iimura, Kamizo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method and apparatus for removal of unreacted monomer from synthesized high polymer latex. 4,032,497, Cl. 260-29.60R.
Kiefer, Hans Walter; Riethmuller, Lothar Herbert; and Spreitzhofer, Ernst Gunther Robert, to Perkin-Elmer Corporation, The. Apparatus for background absorption compensation in spectrophotometers. 4,032,235, Cl. 356-82.000.
Kienzle, Frank; and Rosen, Perry. Synthesis of cyclopentanol. 4,032,520, Cl. 260-240.00R.
Kienzle Uhrenfabriken GmbH: *See—*
Haag, Albrecht; and Stechmann, Helmut, 4,031,693.
Kiethe, Horst: *See—*
Zapf, Gerhard; Albano-Muller, Lothar; Kiethe, Horst; and Rohlig, Rainer, 4,032,335.
Killen, Robert H., to Wayne D. Steimle. Inertial performance indicator. 4,031,848, Cl. 116-114.0AH.
Kilpatrick, David John; Shaw, Trevor; and Lewis, David Malcolm, to I.W.S. Nominee Company Limited. Cross-linkable compounds. 4,032,565, Cl. 260-481.00R.
Kilroy, Oliver B. Push-pull mining system. 4,032,195, Cl. 299-19.000.
Kim, Heung Tai, to B. F. Goodrich Company, The. Extrusion adapter. 4,032,279, Cl. 425-382.00R.
Kim, Raymond W. H., to Bell & Howell Company. Target assembly for a target practice range. 4,032,146, Cl. 273-105.600.
Kimura, Tamisuke: *See—*
Matsui, Kazumi; Umemori, Takashi; Shibata, Yutaka; Yamamura, Kinzo; Kimura, Tamisuke; and Kashiwara, Tomokazu, 4,031,990.
King, John M.: *See—*
Hotten, Bruce W.; and King, John M., 4,032,462.
Kintner, Edwin K. Butterfly valve assembly. 4,032,108, Cl. 251-306.000.
Kinzler, Jack A.; Heffernan, James T.; Fehrenkamp, Leroy G.; and Lee, William S., to United States of America, National Aeronautics and Space Administration. Surface finishing. 4,032,089, Cl. 244-123.000.
Kippenberg, Horst: *See—*
Hassler, Heinrich; Kippenberg, Horst; and Schreiner, Horst, 4,032,301.
Kirby Lumber Corporation: *See—*
Robinson, John W., 4,031,631.
Kischio, Werner, to U.S. Philips Corporation. Electric incandescent lamp. 4,032,808, Cl. 313-178.000.
Kishi, Hirotoshi: *See—*
Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, 4,032,137.
Kita, Tsutomu: *See—*
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Kittl, Hans: *See—*
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Kitzmantel, Peter: *See—*
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Kiwaki, Hisakatsu: *See—*
Ibamoto, Masahiko; and Kiwaki, Hisakatsu, 4,032,833.
Kiyokuni, Nobuaki, to Fuji Electric Company Ltd. Compressed gas filled circuit breaker. 4,032,988, Cl. 361-115.000.
Kiyonaga, Kingo: *See—*
Nakamura, Hideki; and Kiyonaga, Kingo, 4,032,302.
Klein, Howard P.: *See—*
Schulze, Heinz; and Klein, Howard P., 4,032,484.
Klenke, Richard J., to American Products, Inc. Grain drill with disk biasing means. 4,031,834, Cl. 111-85.000.
Klieger, Erich; Beich, Wolfgang; and Schroder, Eberhard, to Schering Aktiengesellschaft. Triiodoisophthaiic acid monoamino acid amides, process for the preparation thereof, and use thereof as X-ray contrast media. 4,032,567, Cl. 260-519.000.
Klimo, Robert G., to Cleveland Machine Controls, Inc. Commutating oscillator and current-limiter for solid state switching circuits. 4,032,825, Cl. 318-139.000.
Kline, Jan C., to Caterpillar Tractor Co. Heat exchanger system and ducting arrangement therefor. 4,031,953, Cl. 165-166.000.
Klingler, Lawrence R.; and Shook, Daniel E. Lock-protective device. 4,031,719, Cl. 70-56.000.
Klockner-Werke AG: *See—*
Linde, Joachim; and Spath, Wolfgang, 4,032,277.
Klopach, Robert T.: *See—*
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Kluy, Werner: *See—*
Birnkraut, Hans-Walter; and Kluy, Werner, 4,032,692.
Knapik, H. Peter G.; and Adams, Frank H., to UOP Inc. Hydrocarbon conversion with a selectively sulfided acidic multimetallic catalytic composite. 4,032,475, Cl. 252-439.000.
Knapp, Lawrence Robert. Water pipe. 4,031,906, Cl. 131-173.000.
Knappstein, Johannes; Tewes, Heinrich; and Woikowski, Robert, to Carl Still, Firma; and Ruhrkohle AG. Sealing device for a coke oven door. 4,032,409, Cl. 202-248.000.
Knight, Robert K.: *See—*
Sandiford, Burton B.; and Knight, Robert K., 4,031,958.
Knippelmier, Gary H., to A. P. C. Industries, Inc. Method and apparatus for measuring the capacitance of telephone cable pairs. 4,032,841, Cl. 324-60.0CD.
Knoll, Heinz W.: *See—*
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Kobayashi, Koichi: *See*—
Karikawa, Tohru; and Kobayashi, Koichi, 4,032,938.

Kobayashi, Reisuke; Sato, Hironari; Takita, Kiyoshi; and Toyama, Nobuo, to Kumiai Chemical Industry Co., Ltd. Process for using cell wall-lysing enzymes. 4,032,663, Cl. 426-51.000.

Kobayashi, Teruo; and Yamamoto, Kazumasa, to Matsushita Electric Industrial Co., Ltd. Gas combustion device with safety device. 4,032,286, Cl. 431-76.000.

Kobayashi, Toshio: *See*—
Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, 4,032,924.

Kobayashi, Tsuyoshi: *See*—
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.

Kobayashi, Yoshichika; Akutsu, Hidezoh; and Iwama, Katsuaki, to Matsushita Electronics Corporation. Fluorescent high-pressure mercury-vapor lamp. 4,032,812, Cl. 313-487.000.

Koblanski, John N., to Ocean Ecology Ltd. Method and apparatus for ultrasonically removing contaminants from water. 4,032,438, Cl. 210-19.000.

Koch, Russell William; and Oberster, Arthur Eugene, to Firestone Tire & Rubber Company, The. Curable sealant two-component composition containing butyl rubber derived from isoolefin and open-chain conjugated diolefin. 4,032,500, Cl. 260-33.6AQ.

Kock, Theodorus Joannes: *See*—
Bauer, Herbert Edward; Goossens, Bertus; Kock, Theodorus Joannes; and Manders, Johannes Laurentius Cornelis, 4,032,465.

Koda, Nobuo John, to Hughes Aircraft Company. Pyroelectric radiation sensor and imaging device utilizing same. 4,032,783, Cl. 250-333.000.

Kodama, Katsuhisa: *See*—
Keshi, Akizo; Kodama, Katsuhisa; Takemura, Ichiro; Tairaka, Yoshihiko; and Yoshinaga, Kunio, 4,032,574.

Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich. Apparatus for continuous winding of filament on spools. 4,032,076, Cl. 242-25.00A.

Koh-I-Noor Rapidograph, Inc.: *See*—
Suchan, Joseph T.; and Burell, Vincent A., 4,032,627.

Kohler, William H., to Abex Corporation. Slip/slide detector control circuit. 4,032,197, Cl. 303-96.000.

Kohmura, Isao; Tahara, Yukio; Futaki, Kiyoshi; and Tange, Hiroshi, to Mitsubishi Paper Mills, Ltd. Thermosensitive recording material. 4,032,690, Cl. 428-263.000.

Koide, Sakae; and Aoki, Shigeo, to Tahara-Shoyei Engineering Co., Ltd. Automatic profiling machine. 4,031,669, Cl. 51-142.000.

Koistinen, Clayton W., to Rockwell International Corporation. Low profile keyboard switch having panel hinged actuators and cantilevered beam snap acting contacts. 4,032,729, Cl. 200-5.00A.

Kojima, Shiro: *See*—
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Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich, 4,032,076.

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Koller, Frank J., Jr., to Armstrong Cork Company. Method of increasing the freeness of asbestos slurries. 4,032,392, Cl. 162-155.000.

Kolling, Heinrich; Thomas, Herbert; Widdig, Arno; and Wollweber, Hartmund, to Bayer Aktiengesellschaft. Phenylguanidines useful as anthelmintic agents. 4,032,655, Cl. 424-300.000.

Kolm, Henry H.; and Oberteuffer, John A., to Sala Magnetics, Inc. Vortical flow distributor. 4,032,114, Cl. 259-4.00R.

Kolodny, Edwin Ralph: *See*—
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Komaba, Shiro; and Goshima, Yoshitomo, to Canon Kabushiki Kaisha. Feed cassette. 4,032,136, Cl. 271-160.000.

Komarov, Jury Ivanovich; Parshin, Alexei Nikolaevich; and Gorbunova, Ljubov Yakovlevna. Heald frame drive of the shedding motion of wave-type shedding looms. 4,031,927, Cl. 139-436.000.

Komiya, Yutaka: *See*—
Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, 4,032,137.

Kondo, Naomitsu: *See*—
Kato, Shozo; Takahashi, Yutaka; Miyaji, Yorio; Kondo, Naomitsu; and Fukumoto, Mikio, 4,032,020.

Koo, Tuh-Kai, to NCR Corporation. Method of manufacturing dielectrically isolated semiconductive device. 4,032,373, Cl. 148-175.000.

Koppers Company, Inc.: *See*—
Blommers, Elizabeth A.; and Moult, Roy H., 4,032,515.

Korhumel Industries, Inc.: *See*—
Strobl, Fred A.; and Di Legge, Felix, 4,032,828.

Kormany, Geza; Kabas, Guglielmo; Schlapfer, Hans; and Siegrist, Adolf Emil, to Ciba-Geigy Corporation. Process for the manufacturing of styrene derivatives, new styrene derivatives and their use as optical brighteners. 4,032,503, Cl. 260-40.00P.

Kos, Steven, to Northern Telecom Limited. Drive circuit for thermal printing array. 4,032,925, Cl. 346-76.00R.

Koshelev, Nikolai Vasilievich. Hydraulic vibrator for actuator drive. 4,031,812, Cl. 91-224.000.

Koshiba, Suzuko: *See*—
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Kossoff, George; and Robinson, David Errol, to Commonwealth of Australia, c/o Dept. of Health, The. Ultrasonic echogram display. 4,031,743, Cl. 73-67.80R.

Kotlarchik, Carl, Jr.; Minsk, Louis M.; and Fletcher, George L., Jr., to Eastman Kodak Company. Sulfonamide compounds and polymers derived therefrom. 4,032,518, Cl. 260-79.30M.

Kotlarchik, Carl, Jr.: *See*—
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Kouvoussis, Anthony E.: *See*—
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Kozai, Tetsuo: *See*—
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Kraftwerk Union Aktiengesellschaft: *See*—
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Kratochvil, Egon: *See*—
Schwab, Johann; Gluck, Maternus; Kratochvil, Egon; and Kitzmantel, Peter, 4,032,275.

Kratz, Jerrold Kerwin; and Christensen, Edward Walter, II, to RCA Corporation. Beam adjustment assembly for a cathode ray tube. 4,032,872, Cl. 335-212.000.

Krekel, Hendrik. Method and a device for producing a plate-like structural element. 4,032,612, Cl. 264-259.000.

Kreucoha AG: *See*—
Kreuter, Walter, 4,032,667.

Kreuter, Walter, to Kreucoha AG. Method for coating confectionery articles with chocolate. 4,032,667, Cl. 426-306.000.

Kreuzer, Franz-Heinrich; and Wick, Manfred, to Consortium fur Elektrochemische Industrie GmbH. Method for preparing modified polysiloxanes. 4,032,499, Cl. 260-33.4SB.

Krishna, Surinder: *See*—
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Krolak, Ronald L.; and Parker, Duane L., to Caterpillar Tractor Co. Cushioned push dozer device. 4,031,968, Cl. 172-801.000.

Kroll, Harry: *See*—
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Kruger, Michael: *See*—
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Krutsch, John R.: *See*—
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Kubo, Masaharu: *See*—
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Kubodera, Seiiti: *See*—
Inouye, Kozo; Yokota, Yukio; Okumura, Akio; Kubodera, Seiiti; and Shiba, Keisuke, 4,032,345.

Kudlacik, Henry W.; and Winchester, Robert L., to General Electric Company. Reactor core. 4,032,874, Cl. 336-60.000.

Kuemmerle, Karl Albert: *See*—
Jenny, Christian Jakob; and Kuemmerle, Karl Albert, 4,032,899.

Kuenzig, Ernest O.; and Pennino, Frank L., to Forest Mechanical Products Corporation. Sealing and shearing member in a plastic resin blow molding machine. 4,032,278, Cl. 425-525.000.

Kuga, Hironari: *See*—
Furuta, Isao; Iwamoto, Shinsuke; Kuga, Hironari; and Chikatsu, Yoshishige, 4,031,746.

Kumazawa, Akihiko: *See*—
Ishikawa, Masaru; and Kumazawa, Akihiko, 4,032,202.

Kumiai Chemical Industry Co., Ltd.: *See*—
Kobayashi, Reisuke; Sato, Hironari; Takita, Kiyoshi; and Toyama, Nobuo, 4,032,663.

Kuntz, Howard W., to Raymond International Inc. Formation of elevated structures. 4,031,687, Cl. 52-742.000.

Kunz, Raymond W., to Clairol Incorporated. Thermal hair styling appliance having interchangeable attachments. 4,032,747, Cl. 219-222.000.

Kupperman, Dennis I.: *See*—
Kupperman, Sam; and Kupperman, Dennis I., 4,031,656.

Kupperman, Sam; and Kupperman, Dennis I., to R B Toy Development Co. Plastic toy integrally formed and molded with a propeller and means for attaching the toy to a support member. 4,031,656, Cl. 46-53.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Kidoh, Kunizoh; Wakamori, Hideki; and Iimura, Kamizo, 4,032,497.

Kurosawa, Ryoichi: *See*—
Nabae, Akira; Shimamura, Takeo; Shimizu, Ichirou; and Kurosawa, Ryoichi, 4,032,831.

Kurzmann, Harald: *See—*
Huhse, Peter; Marin, Heiner; Kurzmann, Harald; and Henry, Marion, 4,032,737.

Kushner, Benjamin H.: *See—*
Jureit, John Calvin; and Kushner, Benjamin H., 4,031,803.

Kutz, Heinrich, to Schloemann-Siemag Aktiengesellschaft. Workpiece manipulator for use in a forging press. 4,031,736, Cl. 72-422.000.

Kuxdorf, Bernhard; Pusche, Herbert; Erpenbach, Heinz; and Riechmann, Wernfried, to Hoechst Aktiengesellschaft. Distilling column. 4,032,410, Cl. 202-158.000.

Kwant, Pieter B.: *See—*
Goudriaan, Frans; and Kwant, Pieter B., 4,032,474.

Kyburz, Emilio: *See—*
Gerecke, Max; Kyburz, Emilio; and Kaplan, Jean-Pierre, 4,032,525.

Kyoto Ceramic Co., Ltd.: *See—*
Hirabayashi, Masaya; and Enjo, Hiromasa, 4,032,674.

La Telemecanique Electrique: *See—*
Arvisenet, Jacques; Guery, Jean-Pierre; Olifant, Jacques; and Thomas, Christian, 4,032,823.

Labaz: *See—*
Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; and Broll, Madeleine, 4,032,660.

Labkovsky, Mark Abramovich: *See—*
Kogos, Aizik Markovich; Kolchanov, Flegont Andreevich; Gnedov, Adolf Alexeevich; Vinogradov, Valery Alexandrovich; Labkovsky, Mark Abramovich; Filatov, Sergei Alexandrovich; Kolesov, Vladimir Mikhailovich; Khrapchenkov, Oleg Kirillovich; and Semes, Alexandr Nikolaevich, 4,032,076.

Lagnado, Isaac, to United States of America, Navy. High-frequency CCD adder and multiplier. 4,032,767, Cl. 364-862.000.

Laitram Corporation, The: *See—*
Fowler, John T., 4,031,630.

Lajovic, Dusan S., to Colgate-Palmolive Company. Dispensing container neck thread protection. 4,032,043, Cl. 222-92.000.

Lambert, Bernard Lucien, to Potain Poclain Materiel (P.P.M.). Construction vehicle having retractable wheels for towing. 4,031,976, Cl. 180-14.00R.

Lambert, Gerard Lucien, to Johns-Manville Corporation. Packaging asbestos fibers. 4,032,011, Cl. 206-386.000.

Lamparsky, Dietmar; and Schudel, Peter, to Givaudan Corporation. Perfume compositions containing p-menthane-8-thiol-3-one. 4,032,478, Cl. 252-522.000.

Lamy, Jean L.: *See—*
Morgan, Charles P.; and Lamy, Jean L., 4,032,094.

Lana, Giulio: *See—*
Bottaccio, Giorgio; Chiusoli, Gian Paolo; Alneri, Enzo; Marchi, Marcello; and Lana, Giulio, 4,032,555.

Landsberger, Kurt. Adjustably mounted superimposable toilet seat. 4,031,575, Cl. 4-239.000.

Lang, Rudolf: *See—*
Singer, Franz; Fahlenberg, Paul; and Lang, Rudolf, 4,032,987.

Langley Alloys Limited: *See—*
Richardson, William Henry; and Guha, Prodyot, 4,032,367.

Lansberry, Delbert B. Target game for rolling missile. 4,032,149, Cl. 273-123.00R.

Lanza, Lucio; and Vecchio, Francesco Giovanni, to Ing. C. Olivetti & C., S.p.A. Electronic data processing computer. 4,032,895, Cl. 364-200.000.

Lapeyre, James M., to Digicourse Inc. Controlled reflection readout for digital displays. 4,032,222, Cl. 350-276.00R.

Laran, Roy Joseph; Loftin, H. Paul; and McIntyre, Daniel C., to Ciba-Geigy Corporation. Process for the preparation of cyanogen chloride. 4,032,619, Cl. 423-379.000.

Larker, Hans; Lundblad, Erik; Lundback, Bertil; and Nilsson, Jan, to ASEA. Method for hydrostatic extrusion of tubes. 4,031,732, Cl. 72-60.000.

Larkin, G. Eugene; and Buchi, Richard H. Method for reclaiming used hydraulic fluid. 4,032,441, Cl. 210-63.00R.

Larned, Thomas A., to United States of America, Air Force. Aircraft seat cushion. 4,031,579, Cl. 5-355.000.

Larsen, Glen D., to Southern Railway Company. Adjustable bracket assembly for a rail car coupler. 4,032,017, Cl. 213-61.000.

Larson, Laverne J., to United States of America, Air Force. Pressurized chaff canister. 4,031,828, Cl. 102-89.00R.

Larsson, Karl H. Adjustable tension spring anchor. 4,032,129, Cl. 267-179.000.

Lasko, Robert A., deceased (by Lasko, Ruth, administratrix); and Miller, Claud T., to Hitchcock Chair Company. Sanding machine for anatomically contoured wooden chair seats and the like. 4,031,668, Cl. 51-137.000.

Lasko, Ruth, administratrix: *See—*
Lasko, Robert A., deceased; and Miller, Claud T., 4,031,668.

Laubie, Michel: *See—*
Malen, Charles; and Laubie, Michel, 4,032,648.

Laubli, Fritz, to Sulzer Brothers Limited. Process and a control system for controlling the exit temperature of vapor flowing through a contact heating surface of a vapor generator. 4,031,863, Cl. 122-479.00R.

Laughlin, William N., deceased; and by Hollis, Thomas L., executor. Shock absorbing apparatus. 4,032,126, Cl. 267-116.000.

Lavallee & Ide, Inc.: *See—*
Lavallee, John A., 4,032,250.

Lavallee, John A., to Lavallee & Ide, Inc. Reamer construction. 4,032,250, Cl. 408-59.000.

Lawson, Richard L. Articulated spray applicator particularly suited for use in cleaning flues and the like. 4,031,910, Cl. 134-167.00C.

Lawson, Robert; and Young, Reginald S., to British Steel Corporation. Filtering a gas stream. 4,032,308, Cl. 55-96.000.

Lear Siegler, Inc.: *See—*
Pareja, Ramon, 4,032,263.

Leasure, Edgar F. Planing attachment for jointers. 4,031,932, Cl. 144-117.00R.

Lebedev, Pavel Pavlovich: *See—*
Shraiman, Evgenia Isaevna; Shraiman, Isai Beniaminovich; Tsesevich, Eduard Iosifovich; Dobroslavsky, Viktor Leonidovich; Ivanov, Nikolai Ivanovich; and Lebedev, Pavel Pavlovich, 4,031,809.

Lebedev, Vladimir Konstantinovich; Troitsky, Vladimir Alexandrovich; and Kalinnikov, Semen Arefievich. Adjustable transformer. 4,032,840, Cl. 323-48.000.

Lecerf, Andre, to Saft-Societe des Accumulateurs Fixes et de Traction. Process for preparing pure silver chromate for electrochemical cells. 4,032,624, Cl. 423-595.000.

Leclerc, Jean-Francois; and Anfossi, Henri, to Service d'Exploitation Industrielle des Tabacs et des Allumettes. Transport device for cylindrical objects rod-shaped, such as cigarettes. 4,032,000, Cl. 198-428.000.

Lecrone, Dale S. Knife mounting unit for roll slicing machine. 4,031,791, Cl. 83-508.200.

Ledet, Charles A., to Baker Oil Tools, Inc. Down hole inhibitor injector. 4,031,955, Cl. 166-183.000.

Lee, Chi-Long; Marko, Ollie W.; and Schulz, Jay R., to Dow Corning Corporation. Organosiloxane compositions for liquid injection. 4,032,502, Cl. 260-37.0SB.

Lee, Henry L., Jr.; and Orlowski, Jan A., to Lee Pharmaceuticals. X-ray opaque filler useful in dental and medical restorative compounds. 4,032,504, Cl. 260-42.180.

Lee, Mary Ellen: *See—*
Sweeney, Doris; and Lee, Mary Ellen, 4,031,578.

Lee Pharmaceuticals: *See—*
Lee, Henry L., Jr.; and Orlowski, Jan A., 4,032,504.

Lee, William S.: *See—*
Kinzler, Jack A.; Heffernan, James T.; Fehrenkamp, Leroy G.; and Lee, William S., 4,032,089.

Lee, Yoon C., to Monsanto Company. Fire retardant styrenic terpolymer compositions. 4,032,509, Cl. 260-45.75B.

Lee, Yuan T., to United States of America, Energy Research and Development Administration. Isotope separation by photodissociation of Van der Waal's molecules. 4,032,306, Cl. 55-17.000.

Leihgeber, Joseph Q. Portable jig for rafter cuts and other angle cuts. 4,031,794, Cl. 83-829.000.

Leitich, Albert Joseph: *See—*
En, John; and Leitich, Albert Joseph, 4,032,886.

Leland, Ragnvald G. Fountain paint roller. 4,032,238, Cl. 401-197.000.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Johnson, William S., 4,032,579.

Lendi, Georges; Ginggen, Serge R.; and Vadi, Gildo, to Tesa S.A. Centering and measuring head for measuring machines. 4,031,632, Cl. 33-178.00R.

Lenne, William, to Essilor International Cie Generale d'Optique. Cams suitable for use in motion transmitting mechanism and motion transmitting mechanism incorporating such cams. 4,031,776, Cl. 74-567.000.

Lentini, Peter S. Tire chock. 4,031,983, Cl. 188-32.000.

Lermann, Peter; Stumpf, Friedrich; and Fauth, Gunter, to AGFA-Gevaert, A.G. Exposure control for photographic apparatus. 4,032,935, Cl. 354-29.000.

Lerner, Jack. Remote volume control plug. 4,032,206, Cl. 339-42.000.

Leroy, Christian Ludovic: *See—*
Leroy, Henri Joseph Marie Adrien; and Leroy, Christian Ludovic, 4,031,588.

Leroy, Henri Joseph Marie Adrien; and Leroy, Christian Ludovic, to Leroy, Henri Joseph Marie Andrien. Broom. 4,031,588, Cl. 15-171.000.

Leroy, Henri Joseph Marie Andrien: *See—*
Leroy, Henri Joseph Marie Adrien; and Leroy, Christian Ludovic, 4,031,588.

Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. 4-Amino (or halo or hydroxy or hydrazino)-2-(pyridinyl)pyrimidines. 4,032,523, Cl. 260-256.40N.

Letov, Nikolai Nikolaevich: *See—*
Tatkov, Viktor Arsentievich; and Letov, Nikolai Nikolaevich, 4,032,256.

Leutwyler, Roy: *See—*
Jureit, John Calvin; Cotten, Howell J.; Castillo, Adolfo; and Leutwyler, Roy, 4,031,604.

LeVeen, Harry H. Radio frequency power generator having adjustable stabilized output level and fail-safe control circuits. 4,032,860, Cl. 331-63.000.

Lever Brothers Company: *See—*
Bauer, Herbert Edward; Goossens, Bertus; Kock, Theodorus Joannes; and Manders, Johannes Laurentius Cornelis, 4,032,465.

Levin, Bernard. Lingual bladed tooth. 4,031,623, Cl. 32-8.000.

Levine, Peter Alan, to RCA Corporation. Smear reduction in CCD imagers. 4,032,976, Cl. 358-213.000.

Levinthal, Cyrus. System for storing and retrieving information at the molecular level. 4,032,901, Cl. 340-173.0NC.

Lewandowski, Raymond F.: *See—*
Golbeck, Bernard J.; Lewandowski, Raymond F.; and Kennedy, Maurice E., 4,032,730.
Lewis, David Malcolm: *See—*
Kilpatrick, David John; Shaw, Trevor; and Lewis, David Malcolm, 4,032,565.
Lewis, Irwin Charles, to Union Carbide Corporation. Process for producing carbon fibers from mesophase pitch. 4,032,430, Cl. 208-39.000.
Lewis, Leroy C., to United States of America, Energy Research and Development Administration. Process for the disposal of alkali metals. 4,032,614, Cl. 423-179.000.
Lewis, Richard W., to Boeing Company, The. Compensated vehicle heading system. 4,032,758, Cl. 235-150.200.
Lewis, Robert A.: *See—*
De Groat, Philip M.; and Lewis, Robert A., 4,031,727.
Liao, Henry H. J., to Xerox Corporation. Gray scale interpolation technique. 4,032,977, Cl. 358-280.000.
Liberty Mutual Insurance Company: *See—*
DeLuca, Carlo J., 4,031,882.
Licentia Patent-Verwaltungs-GmbH: *See—*
Glitz, Ekkehard, 4,032,763.
Lichtenberg, Heinz D.: *See—*
Youmans, Arthur H.; and Lichtenberg, Heinz D., 4,031,750.
Lieberman, Stanley J. Programming apparatus. 4,032,753, Cl. 235-61.60M.
Liebler, Heinz: *See—*
Helder, Johan; Holzinger, Karl; Guegel, Gerd; Liebler, Heinz; and Pernegger, Wolfgang, 4,032,414.
Lightcraft of California: *See—*
Berkenhoff, Hans Peter, 4,032,208.
Lilienthal, Peter Frederick, II: *See—*
Chu, Tze Yao; Jaluria, Yogesh; Lilienthal, Peter Frederick, II; and Wenger, George Michael, 4,032,033.
Lindberg, Gunnar V. Automatic tray loading device. 4,032,027, Cl. 214-16.600.
Lindblad, Stig Martin. Locking device for a safety belt of winding-up type intended for vehicles. 4,032,080, Cl. 242-107.40A.
Linde, Joachim; and Spath, Wolfgang, to Klockner-Werke AG. Injection molding machine with hydraulically operated closure device. 4,032,277, Cl. 425-591.000.
Lindfors, Olov Halvar, to AB Volvo Penta. Device for mounting chassis details onto an automobile body. 4,031,982, Cl. 187-8.590.
Lindner, Heinz, to VEB Wirkmaschinenbau. Patterning apparatus for knitting machines, particularly for manufacturing patterned knitted pile fabrics on crochetting machines. 4,031,717, Cl. 66-84.00R.
Lindon, Thomas Derek: *See—*
Walters, Ronald Bernard; Hamey, Peter Michael; Hammond, John Anthony Gordon; and Lindon, Thomas Derek, 4,031,813.
Lindstrom, Olle Birger, to AB Olle Lindstrom. Procedure to stabilize an iron air battery. 4,032,693, Cl. 429-17.000.
Linscott, Phillip S., Jr., to Sundstrand Corporation. Brazing clip. 4,032,057, Cl. 228-56.000.
Lipfert, Donald Ernest, to Deres Development Corporation. Protective head gear and body equipment. 4,032,127, Cl. 267-151.000.
Little Giant Industries Inc.: *See—*
Spencer, Edward, 4,031,981.
Little, Lester D.: *See—*
Ryckman, William D., Jr.; and Little, Lester D., 4,031,638.
Litton Systems, Inc.: *See—*
Jarmofsky, Seymour, deceased; Jarmofsky, Doris F., legal representative and heir; and Jarmofsky, Nancy H., heir, 4,032,215.
Loepfe, Erich: *See—*
Domig, Rene; Morf, Ernst; and Loepfe, Erich, 4,031,924.
Loev, Bernard: *See—*
Groves, William G.; Loev, Bernard; and Perchonock, Carl D., 4,032,656.
Loew, Dieter M.: *See—*
Spiegel, Rene; Gogerty, John H.; Loew, Dieter M.; and Eden, Phillip L., 4,032,637.
Loewenstein, Paul Nicholas: *See—*
Metcalf, Eric; and Loewenstein, Paul Nicholas, 4,032,797.
Lofgren, Karl Borje: *See—*
Eriksson, Hans Georg; Sjoberg, Karl Gosta; and Lofgren, Karl Borje, 4,032,361.
Loftin, H. Paul: *See—*
Laran, Roy Joseph; Loftin, H. Paul; and McIntyre, Daniel C., 4,032,619.
Long Manufacturing Co., Inc.: *See—*
Atkinson, Wallace E., 4,031,724.
Loose, Peter William; and Tamkin, Martyn Ridley, to Gardenia Limited. Food processing machinery. 4,031,821, Cl. 99-643.000.
Lorain Products Corporation: *See—*
Chambers, Charles W., Jr., 4,032,726.
Losehand, Reinhard: *See—*
Kesel, Guenther; and Losehand, Reinhard, 4,032,947.
Loucks, Richard S., to International Telephone and Telegraph Corporation. Compensated signal isolator. 4,032,843, Cl. 324-96.000.
Lovelady, Kenneth T.: *See—*
White, John T.; and Lovelady, Kenneth T., 4,032,928.
Lovell, Walter Carl: *See—*
Grise, Frederick Gerard Joseph; and Lovell, Walter Carl, 4,031,836.
Lovness, Donald E., to Judd Ringer Corporation. Composting mixture. 4,032,318, Cl. 71-9.000.
Lowe, Peter R.: *See—*
Quarton, William T.; and Lowe, Peter R., 4,032,760.
Lu, Shau-Zou; and Nowicki, Henry, to GAF Corporation. Reactants addition and concentration control system. 4,031,912, Cl. 137-5.000.
Lubrizol Corporation, The: *See—*
Dorer, Casper John, Jr.; and Miller, Clark Ober, 4,032,303.
Dorer, Casper John, Jr.; and Miller, Clark Ober, 4,032,304.
Hoke, Donald Irvin, 4,032,461.
Lucas Electrical Company Limited, The: *See—*
Bard, Nicholas John; and Williams, Malcolm, 4,032,755.
Luchtenberg, Russell O.; and Buchwald, James P., to Thermo Valve Corporation. Thermostatic valve. 4,032,068, Cl. 236-34.500.
Luck, Stephen Royall: *See—*
Hendricks, David Allen; Howe, Milton Albert, Jr.; Luck, Stephen Royall; Morris, Alfred Ray; and Owen, Dave Leslie, 4,032,038.
Luckey, George W., to Eastman Kodak Company. Process for preparing yttrium oxide and rare earth metal oxide phosphors. 4,032,471, Cl. 252-301.40R.
Lukens, Robert T.; and Jaksim, Stanley, to Indian Head Inc. Self-centering spring actuated auxiliary brake mechanism. 4,031,814, Cl. 92-63.000.
Lum, Jack G. S., to Sound Technology, Inc. Filter circuit. 4,032,857, Cl. 330-151.000.
Lundback, Bertil: *See—*
Larker, Hans; Lundblad, Erik; Lundback, Bertil; and Nilsson, Jan, 4,031,732.
Lundblad, Erik: *See—*
Larker, Hans; Lundblad, Erik; Lundback, Bertil; and Nilsson, Jan, 4,031,732.
Lunt, Anthony Randle: *See—*
Cross, Andrew; Lunt, Anthony Randle; and Doherty, Joseph Brian, 4,032,398.
Lush, Gerald Bertram, to Boots Company Limited, The. Synergistic herbicidal mixtures of 4-chloro-2-oxobenzothiazolin-3-ylacetic acid and 2-methoxy-3,6-dichlorobenzoic acid. 4,032,320, Cl. 71-90.000.
Luth, Claus-Peter, to Macchine Tessili Circolari MATEC S.p.A. of Roma. Electronic system for centrally controlling a plurality of knitting machines. 4,031,718, Cl. 66-154.00A.
Luwa AG: *See—*
Engler, Peter, 4,031,951.
Lyshkow, Norman A., to Combustion Equipment Associates, Inc. Pollution monitoring apparatus. 4,032,297, Cl. 23-254.00E.
M & T Chemicals Inc.: *See—*
Dworkin, Robert Dally; and Ejk, Adam Joseph, 4,032,552.
Treadwell, Kenneth; and Gitlitz, Melvin H., 4,032,468.
Maber, Terence Walter: *See—*
Fisher, Maurice; Kruger, Michael; and Maber, Terence Walter, 4,032,359.
Mabey, Michael David; and Foster, James Malcolm, to Depallorator Corporation Limited. Depalletizers. 4,032,021, Cl. 214-8.50F.
MacAdams, John L.; Wu, William C. L.; and Joyner, Richard S., to Chemplex Company. Resin formulation for rotational molding and shaped structures. 4,032,600, Cl. 260-897.00B.
Macchine Tessili Circolari MATEC S.p.A. of Roma: *See—*
Luth, Claus-Peter, 4,031,718.
MacIntosh, Frank W., to Gas-Fired Products, Inc. Apparatus for loading tobacco in barns. 4,032,023, Cl. 214-16.40R.
Maciolek, Joseph R., to United Technologies Corporation. Automatic gain control for stability augmentation systems. 4,032,083, Cl. 244-17.130.
MacNeil, Peter. Cold air blast wake-up apparatus. 4,031,711, Cl. 62-261.000.
Macronetics, Inc.: *See—*
Sehestedt, William H., 4,031,667.
Madan, Bhim S., to General Electric Company. Bearing strap and cooler. 4,032,261, Cl. 417-366.000.
Magerlein, Barney J., to Upjohn Company, The. 17-Phenyl-18,19,20-trinor-cis-4,5-didehydro-PGF, compounds. 4,032,561, Cl. 260-473.00A.
Magiera, David L., to Wicks & Nemer, P.A. Board game apparatus. 4,032,154, Cl. 273-134.0AT.
Magnatex Limited: *See—*
Daly, Daniel; Davis, Kenneth Paul; and Boughtflower, Charles Arthur, 4,031,771.
Maillet, Alfred Marie Aime: *See—*
Braudeau, Pierre; and Maillet, Alfred Marie Aime, 4,032,741.
Makino, Jun-ichi: *See—*
Okamura, Masami; Aoki, Fumio; Sano, Yoshihiro; Makino, Jun-ichi; Miki, Yoshiteru; Sasaki, Hiroshi; and Seo, Kazuo, 4,032,913.
Malaval, Claude: *See—*
Defauchy, Jean; and Malaval, Claude, 4,032,399.
Malen, Charles; and Laubie, Michel, to Science Union et Cie. Method and compositions containing thiochroman compounds for treating cardiac rhythm disorders. 4,032,648, Cl. 424-275.000.
Malinski, S. W.; and Mueller, Thomas L., to Malinski, S. W. Concentric contra-rotating bead deflector mechanism for tire mounting apparatus. 4,031,941, Cl. 157-1.170.
Mallon, Dietmar, to Siemens Aktiengesellschaft. Circuit arrangement of a stereo-hunting device in a stereo decoder. 4,032,715, Cl. 179-15.0BT.
Mallon, Dietmar, to Siemens Aktiengesellschaft. Circuit arrangement for a continuous adjustment of the base width in a stereo decoder. 4,032,717, Cl. 179-15.0BT.

Malott, Steve, to Qonaar Corporation. Coin operated electronic parking meter. 4,031,991, Cl. 194-1.00R.

Malueg, Richard M.; and Meier, Michael J., to McDonnell Douglas Corporation. Detector array gain compensation. 4,032,975, Cl. 358-213.000.

Man Design Co., Ltd.: *See—*
Takahashi, Shiro, 4,032,264.

Mandel, Alan F.; Capuano, Louis M.; Frask, Theodore E.; and Bedel, Denis E., to Westinghouse Electric Corporation. Elevator system. 4,032,882, Cl. 340-19.00R.

Manders, Johannes Laurentius Cornelis: *See—*
Bauer, Herbert Edward; Goossens, Bertus; Kock, Theodorus Joannes; and Manders, Johannes Laurentius Cornelis, 4,032,465.

Mange, Franklin E.: *See—*
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Mannear, Charles H.: *See—*
Mannear, Idabelle K., 4,032,662.

Mannear, Idabelle K., to Mannear, Idabelle K.; Mannear, Charles H.; Kanarr, George W.; and Kanarr, Ruth A., part interest to each. Method for the treatment of contact allergic dermatitis. 4,032,662, Cl. 424-331.000.

Mannesmannrohren-Werke AG.: *See—*
Schonfeld, Wolfram; Philipps, Armin; and Runkel, Fritz, 4,031,738.

Mano, Shiro: *See—*
Moriya, Masafumi; Hosoda, Kazuo; Takai, Makoto; and Mano, Shiro, 4,032,482.

Mansfield, Robin. Electric shaver. 4,031,618, Cl. 30-41.500.

Marchi, Marcello: *See—*
Bottaccio, Giorgio; Chiusoli, Gian Paolo; Alneri, Enzo; Marchi, Marcello; and Lana, Giulio, 4,032,555.

Marechal, Robert Rene, to SICMA - Societe Industrielle et Commerciale de Materiel Aeronautique. Device for actuating a sheathed control cable. 4,031,773, Cl. 74-501.50R.

Marin, Heiner: *See—*
Huhse, Peter; Marin, Heiner; Kurzmann, Harald; and Henry, Marion, 4,032,737.

Mark, Victor, to General Electric Company. Flame retardant polycarbonate composition. 4,032,506, Cl. 260-45.90R.

Markle, Stanley Alan: *See—*
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Marko, Ollie W.: *See—*
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Marley Cooling Tower Company, The: *See—*
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Maroni, Victor A.; and Van Deventer, Erven H., to United States of America, Energy Research and Development Administration. Hydrogen-isotope permeation barrier. 4,031,921, Cl. 138-140.000.

Marschak, Howard J. Base for an upright for forming a stand or the like. 4,032,098, Cl. 248-165.000.

Marshall, John L.: *See—*
Hughes, Lee E.; Marshall, John L.; and Doring, Dieter, 4,032,766.

Marshall, Walter R.: *See—*
Moked, Isaac; Handwerk, Richard H.; and Marshall, Walter R., 4,032,391.

Marsheck, William J.: *See—*
Jiu, James; and Marsheck, William J., 4,032,408.

Martens, David, to D. Marten's Manufacturing Company Ltd. Sealed sewage ejector assembly. 4,032,448, Cl. 210-170.000.

Marti, Heinrich; Zogg, Andreas; and Hardegger, Oskar, to Concast AG. Method and apparatus for changing the secondary cooling during continuous casting of steel. 4,031,946, Cl. 164-89.000.

Martin, Derek Thomas. Constructional elements. 4,032,241, Cl. 403-173.000.

Martin, Edwin J., Jr.; and Yamada, Akemichi, to Wilcox Electric, Inc. Two-frequency instrument landing system with integral monitor. 4,032,920, Cl. 343-108.00R.

Martin, Gilbert Marius Henri: *See—*
Boisrayon, Gerald Marc Albert; and Martin, Gilbert Marius Henri, 4,031,840.

Martin, John Frederick: *See—*
Gilbride, Andrew John; and Martin, John Frederick, 4,031,835.

Martin, Manfred; and Scharfe, Gerhard, to Bayer Aktiengesellschaft. Process for preparing 1,4-naphthoquinone. 4,032,548, Cl. 260-396.00R.

Martin, Thomas B.; Herscher, Marvin B.; and Cox, Robert B., to Threshold Technology, Inc. Word boundary detector for speech recognition equipment. 4,032,710, Cl. 179-1.0SA.

Maruca, Joseph P.: *See—*
Rose, Lloyd E.; and Maruca, Joseph P., 4,031,645.

Maruzen Oil Co. Ltd.: *See—*
Fujiwara, Hiroshi; Takahashi, Asao; and Miyamoto, Motomu, 4,032,513.
Fujiwara, Hiroshi; Takahashi, Asao; and Suzuki, Ken, 4,032,598.

Marvel Engineering Company: *See—*
Erbach, Arthur R.; Franck, Allen R.; Mulee, Dennis L.; and Schmitt, Wilhelm E., 4,032,743.

Marvin Glass & Associates: *See—*
Keller, Albert G.; Nix, Donald F.; and Morrison, Howard J., 4,031,659.
Meyer, Burton C.; and Allen, Robert K., 4,032,295.
Morrison, Howard J.; and Brand, Derek A., 4,031,944.

Maryland Cup Corporation: *See—*
Epple, Richard R., 4,032,045.

Maschinenfabrik Stromag GmbH: *See—*
Faust, Werner, 4,031,714.

Masin, George F., to United States of America, Navy. Dual channel radio frequency fuzing system. 4,032,918, Cl. 343-7.0PF.

Masson, Claude Jeanine, to Eastman Kodak Company. Magnetic recording element and method for making same. 4,032,682, Cl. 428-309.000.

Matare, Herbert F., to International Audio Visual, Inc. Method of forming an epitaxial layer on a crystalline substrate. 4,032,370, Cl. 148-171.000.

Matchett, Robert W., to Fibredyne, Inc. Plural stage filter cartridge wherein at least one stage comprises pulverized particulate material. 4,032,457, Cl. 210-489.000.

Matheny, Coy Edwin, to International Telephone and Telegraph Corporation. Direct station selection circuit. 4,032,724, Cl. 179-99.000.

Matsui, Kazumi; Umemori, Takashi; Shibata, Yutaka; Yamamura, Kinzo; Kimura, Tamisuke; and Kashiwara, Tomokazu, to Japanese National Railways; Sumitomo Electric Industries, Ltd.; and Sumitomo Rubber Industry, Ltd. Set of current collecting elements used for a current collecting roller. 4,031,990, Cl. 191-63.000.

Matsumoto, Atsuyuki: *See—*
Onoda, Koji; Matsumoto, Atsuyuki; Ogawara, Hiroshi; and Nishimura, Akira, 4,032,485.

Matsumoto, Kimiko. Apparatus for arranging and storing bobbins of yarn or thread. 4,032,013, Cl. 211-13.000.

Matsuo, Masaharu. Apparatus for trimming adhering scrap from a punched cardboard blank. 4,031,816, Cl. 93-36.00A.

Matsuo, Takahal: *See—*
Tatsumi, Chuji; Hashimoto, Yukio; Terashima, Masahiko; and Matsuo, Takahal, 4,032,405.

Matsushita Electric Industrial Co., Ltd.: *See—*
Kobayashi, Teruo; and Yamamoto, Kazumasa, 4,032,286.
Minami, Shunji; Takemura, Takehide; and Oka, Shunzo, 4,032,838.
Miyoshi, Keisuke; and Yukumoto, Toshitaka, 4,032,968.

Matsushita Electric Works Ltd.: *See—*
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Tanaka, Yoshimasa; Imai, Hirozo; Tsutsumi, Tadao; and Oda, Takeshi, 4,031,617.

Matsushita Electronics Corporation: *See—*
Kobayashi, Yoshichika; Akutsu, Hidezoh; and Iwama, Katsuaki, 4,032,812.

Matsuyama, Mitsuo; and Okuhara, Shinzi, to Hitachi, Ltd. Semiconductor speech channel switch. 4,032,892, Cl. 340-166.00R.

Mattern, Alfred, to Siemens Aktiengesellschaft. PCM time division multiplex communication network with digital subscriber stations. 4,032,714, Cl. 179-15.0BA.

Matthews, Charles W., to United States of America, Energy Research and Development Administration. Conversion of ammonia into hydrogen and nitrogen by reaction with a sulfided catalyst. 4,032,618, Cl. 423-351.000.

Matthews, Joseph S.: *See—*
Bacha, John D.; and Matthews, Joseph S., 4,032,547.

Maude, James Walton. Recliner platform. 4,032,099, Cl. 248-188.200.

Maupin, Roger A. Scrubbing apparatus. 4,032,239, Cl. 401-203.000.

Maurer, Dean William: *See—*
Beauchamp, Richard Lawrence; Maurer, Dean William; and O'Sullivan, Thomas Denis, 4,032,697.

Maurer, Fritz: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; Behrenz, Wolfgang; and Hammann, Ingeborg, 4,032,634.

Mausner, Jack J., to Helena Rubinstein, Inc. Creamy nail lacquer remover. 4,032,464, Cl. 252-89.00R.

May & Baker Limited: *See—*
Buttimore, David, 4,032,323.

Mayer-Mader, Rudolf; and Gobel, Wilhelm, to Bayer Aktiengesellschaft. Xanthogen disulphides with functional groups. 4,032,541, Cl. 260-340.900.

Mayo, Bernard Joseph; and Best, John Edward, to E M I Limited. Tomography. 4,032,761, Cl. 235-151.300.

Mazour, Zdenek; and Brunetti, Heimo, to Ciba-Geigy Corporation. Process for the production of phosphite chlorides. 4,032,602, Cl. 260-972.000.

Mazzei, Alessandro: *See—*
Cucinella, Salvatore; and Mazzei, Alessandro, 4,032,703.

McAfee, John Gilmore: *See—*
Subramanian, Gopal; and McAfee, John Gilmore, 4,032,625.

McAlister, Craig L., deceased (by McAlister, George Ruxton, executor), to McGraw-Edison Company. Protector for electric circuits. 4,032,877, Cl. 337-148.000.

McAlister, George Ruxton, executor: *See—*
McAlister, Craig L., deceased, 4,032,877.

McAvoy, John Jerome, to Boeing Company, The. Outrigger air bag landing system. 4,032,088, Cl. 244-100.00A.

McCabe, Logan D.; and McCabe, Stanley G. Spreader-feeder for flatwork ironer. 4,031,639, Cl. 38-143.000.

McCabe, Stanley G.: *See—*
McCabe, Logan D.; and McCabe, Stanley G., 4,031,639.

McCaleb, Robert Earl. Photomeric monitoring device. 4,032,777, Cl. 250-214.00B.

McCall, John M.; and Ursprung, Joseph J., to Upjohn Company, The. N,2-Dicyanoacetimidates. 4,032,559, Cl. 260-465.50R.

McCallister, Kenneth R., to UOP Inc. Manufacture of alumina sol. 4,032,472, Cl. 252-313.00R.

McCarty, William J., to General Electric Company. Method of forming constriction in tubing. 4,031,745, Cl. 72-367.000.
McCormick, Harold E., to Ramsey Corporation. Method for coating parts. 4,032,672, Cl. 427-34.000.
McCormick, Paul W. Bulk hauling freight car unloading apparatus and method of operation. 4,032,026, Cl. 214-152.000.
McCullough, Glenn R.: *See—*
Parker, Wesley A.; Gwyn, John E.; and McCullough, Glenn R., 4,032,300.
McDonald, James L.; and Toussieux, Christian, to Consolidated Engravers Corporation. Method of forming pattern roll. 4,032,378, Cl. 156-645.000.
McDonnell Douglas Corporation: *See—*
Day, John H., 4,032,092.
Goldsworthy, William B.; and Karlson, Harald E., 4,032,383.
Malueg, Richard M.; and Meier, Michael J., 4,032,975.
McDowell, Murvyn M.: *See—*
Michael, Gerald C.; and McDowell, Murvyn M., 4,031,742.
McElhoe, Bruce A.; and Tabrah, Joseph G., to Hawaiian Sugar Planters' Association. Irrigation system flushing valve. 4,031,915, Cl. 137-529.000.
McElhoe, Bruce A.; and Tabrah, Joseph G., to Hawaiian Sugar Planters' Association. Soil irrigation methods and apparatus. 4,032,072, Cl. 239-11.000.
McFadden, Buryl L., Jr., to United States of America, Air Force. Probe system for wind tunnel test section. 4,031,749, Cl. 73-147.000.
McGarr, John J., to USM Corporation. Method of making polyurethane powder. 4,032,516, Cl. 260-77.5AA.
McGee, George S. Screen printer with adjustable screen support and magnetic squeegee means. 4,031,823, Cl. 101-120.000.
McGee, Paul Dean, to Motorola, Inc. Speaker mounting. 4,032,725, Cl. 179-146.00R.
McGinn, Ferdinand M.: *See—*
Herbert, Gerald P.; McGinn, Ferdinand M.; and Embree, Hugh D., 4,031,954.
McGraw-Edison Company: *See—*
Keiser, William, 4,032,821.
McAlister, Craig L., deceased, 4,032,877.
Thompson, Richard D.; Thompson, Douglas; and Beeley, Micheal G., 4,032,294.
McIntyre, Daniel C.: *See—*
Laran, Roy Joseph; Loftin, H. Paul; and McIntyre, Daniel C., 4,032,619.
McIntyre, James Eric: *See—*
Fisher, Ian Stuart; and McIntyre, James Eric, 4,032,595.
McLaren, Edwin C.: *See—*
Dutcher, Daniel P.; and McLaren, Edwin C., 4,032,061.
McLaughlin, Alexander; and Sayigh, Adnan A. R., to Upjohn Company, The. Bituminous composition. 4,032,355, Cl. 106-273.00N.
McNaney, Joseph T. Light optic data handling system. 4,032,220, Cl. 350-161.00W.
McNerney, Richard P., to Schlumberger Technology Corporation. Cable-termination assemblies and methods for manufacturing such assemblies. 4,032,214, Cl. 339-218.00M.
Mead Corporation, The: *See—*
Sanders, Frederick W., 4,032,415.
Meade, Robert P. Television locking mechanism. 4,032,794, Cl. 307-326.000.
Meador, Kenneth B.: *See—*
Bass, David L.; and Meador, Kenneth B., 4,032,030.
Meadows, Geoffrey Walsh, to Du Pont de Nemours, E. I., and Company. Preparation of hydrogen fluoride with low levels of arsenic, iron and sulfite. 4,032,621, Cl. 423-488.000.
Medney, Jonas. High voltage electrical transmission line and conduit therefor and method of making same. 4,032,708, Cl. 174-84.00R.
Mehta Engineering Enterprise: *See—*
Mehta, Girishkumar Ratilal, 4,031,849.
Mehta, Girishkumar Ratilal, to Mehta Engineering Enterprise. Push button switch position indicator. 4,031,849, Cl. 116-124.00L.
Meier, Michael J.: *See—*
Malueg, Richard M.; and Meier, Michael J., 4,032,975.
Meier, Werner: *See—*
Droscher, Walter; Winter, Kurt; and Meier, Werner, 4,032,800.
Meisenheimer, Daniel Thomas, Jr. Omnidirectional inertia switch. 4,032,733, Cl. 200-61.45R.
Meiser, Werner: *See—*
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Meito Sangyo Kabushiki Kaisha: *See—*
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Melvin Corporation: *See—*
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Melvin, Waymon A., Jr., to Westinghouse Electric Corporation. Signal repeater for power distribution line communication systems. 4,032,911, Cl. 340-310.00A.
Mendoza, Luis Esteban. Cordless telephone system. 4,032,723, Cl. 179-41.00A.
Meng, Karl: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,032,646.
Meniere, Charles: *See—*
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Mercer, Roger W. Cast ejector. 4,032,276, Cl. 425-123.000.
Merck & Co., Inc.: *See—*
Baldwin, John J.; and Novello, Frederick C., 4,032,522.
Christensen, Burton G.; and Ratcliffe, Ronald W., 4,032,521.
Merkl, George G. Hydroperoxy group-containing aluminum compound and method of making the same. 4,032,623, Cl. 423-582.000.
Merrill, Stewart H.: *See—*
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Messerschmitt-Boelkow-Blohm GmbH: *See—*
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Metcalf, Eric; and Loewenstein, Paul Nicholas, to Solartron Electronic Group Limited, The. Quantising circuit. 4,032,797, Cl. 307-227.000.
Metropolitan Industries: *See—*
Renkert, J. Steven, 4,031,682.
Mettler Instrumente AG: *See—*
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Metz, Joseph R., to Norco, Inc. Reversing nut for diamond thread screw. 4,031,765, Cl. 74-57.000.
Metzeler Kautschuk AG: *See—*
Neumann, Henning; and Federer, Fritz, 4,031,580.
Meyer, Burton C.; and Allen, Robert K., to Marvin Glass & Associates. Toy vehicle for use with a figure toy. 4,032,295, Cl. 46-202.000.
Miaskoff, Leonard, to Harris Corporation. Band knife tooth shape. 4,031,793, Cl. 83-788.000.
Michael, Gerald C.; and McDowell, Murvyn M. Leak detector using mass concentration gauge. 4,031,742, Cl. 73-40.700.
Michelman, David L.: *See—*
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Michelman Iron Works Corporation: *See—*
Michelman, Lionel S.; Michelman, Samuel M.; Michelman, David L.; and Michelman, Milton, 4,031,722.
Michelman, Lionel S.; Michelman, Samuel M.; Michelman, David L.; and Michelman, Milton, to Michelman Iron Works Corporation. Tamper-proof locking device. 4,031,722, Cl. 70-63.000.
Michelman, Milton: *See—*
Michelman, Lionel S.; Michelman, Samuel M.; Michelman, David L.; and Michelman, Milton, 4,031,722.
Michelman, Samuel M.: *See—*
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Midland-Ross Corporation: *See—*
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Tani, Tatsuo, formerly Nishikawa; Tatsumi, Susumu; Tanaka, Mitsuo; Ota, Sakae; and Midorikawa, Akira, 4,032,229.
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Mignano, Frank J. Collator arm feed head. 4,032,132, Cl. 270-58.000.
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Miki, Yoshiteru: *See—*
Okamura, Masami; Aoki, Fumio; Sano, Yoshihiro; Makino, Junichi; Miki, Yoshiteru; Sasaki, Hiroshi; and Seo, Kazuo, 4,032,913.
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Milkovic, Miran, to General Electric Company. Low cutoff digital pulse filter especially useful in electronic energy consumption meters. 4,032,798, Cl. 307-233.00R.
Miller, Alan Leonard; and Ivey, John Saxon, to Borg-Warner Corporation. Method and apparatus for a transmission control system. 4,031,782, Cl. 74-866.000.
Miller, Blaine Monroe, Jr., to Hobart Corporation. Waste material handling system. 4,032,446, Cl. 210-152.000.
Miller, Clark Ober: *See—*
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Dorer, Casper John, Jr.; and Miller, Clark Ober, 4,032,304.
Miller, Claud T.: *See—*
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Miller, Frank Donald, to Bunker Ramo Corporation. DC to AC inverter with unregulated input and regulated output. 4,032,832, Cl. 363-43.000.
Miller, John E., to United States Steel Corporation. Suction stabilizer for reciprocating pumps and stabilizing method. 4,032,265, Cl. 417-540.000.
Miller, Laurence Lockhart, to TRW Inc. Gerotor motor with a stationary inner member and a rotating and orbiting outer member. 4,032,267, Cl. 418-61.00B.
Miller, Richard E. W. Windshield repair device. 4,032,272, Cl. 425-12.000.
Miller, Thomas R., to Continental Oil Company. Jet nozzle drilling assembly. 4,031,971, Cl. 175-107.000.
Miller, Timothy Allen; and Hansen, Carlo J., to Ralston Purina Company. Simulated bone. 4,032,665, Cl. 426-104.000.
Millette, Gloria Astrid, to Raymond Lee Organization, Inc., The, a part interest. Portable table and lamp fixture. 4,032,770, Cl. 240-4.000.
Minakawa, Masaaki; and Yoshikawa, Toshio, to Nissan Motor Co., Ltd. Insulator. 4,032,125, Cl. 267-63.00A.
Minami, Shunji; Takemura, Takehide; and Oka, Shunzo, to Matsushita Electric Industrial Co., Ltd. Device for generating variable output voltage. 4,032,838, Cl. 323-19.000.

Minnesota Mining and Manufacturing Company: *See—*
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West, Arthur C., III, 4,032,699.

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Mitsubishi Kasei Kogyo Kabushiki Kaisha: *See—*
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Mitsubishi Paper Mills, Ltd.: *See—*
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Mitsubishi Petrochemical Co., Ltd.: *See—*
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Mitsui Toatsu Chemicals, Incorporated: *See—*
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Ozaki, Shoichiro; and Mori, Haruki, 4,032,524.
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Mittelmann, Eugene, to Illinois Tool Works Inc. Two-level temperature control for induction heating. 4,032,740, Cl. 219-10.770.

Miyaji, Yorio: *See—*
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Miyake, Masanobu: *See—*
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Miyamoto, Motomu: *See—*
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Miyamoto, Seiji, to Sanyo Electric Co., Ltd. Amplification and gain control circuit. 4,032,854, Cl. 330-29.000.

Miyoshi, Keisuke; and Yukumoto, Toshitaka, to Matsushita Electric Industrial Co., Ltd. Television image projecting system. 4,032,968, Cl. 358-60.000.

Miyoshi, Munetsugu: *See—*
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Miyoshi Yushi Kabushiki Kaisha: *See—*
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Moked, Isaac; Handwerk, Richard H.; and Marshall, Walter R., to Union Carbide Corporation. Low energy recovery compounding and fabricating systems for plastic materials. 4,032,391, Cl. 159-47.00R.

Molle, Jean Louis; and Boch, Jean Christian, to A.E.C. Societe de Chimie Organique et Biologique. Method of treating fatigue by administering a gulonic acid salt. 4,032,650, Cl. 424-278.000.

Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, to Bayer Aktiengesellschaft. Pyrazol-5-ones. 4,032,646, Cl. 424-273.000.

Moller, Hinrich: *See—*
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Molnar, Ernest L.: *See—*
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Momose, Katsumi; and Okutsu, Kazuhisa. Pattern exposure using a polychromatic light source. 4,032,341, Cl. 96-27.00E.

Monagan, Elmer J., to Teledyne, Inc. Circuit-protecting fuse having arc-extinguishing means. 4,032,879, Cl. 337-278.000.

Monarch Marking Systems, Inc.: *See—*
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Money, George G., Sr. Battery carrier. 4,032,181, Cl. 294-16.000.

Monorapid S.A.S. di Camerano Angelo & C.: *See—*
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Montgomery, W. Leon. Bicycle package transport device. 4,032,166, Cl. 280-204.000.

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Moore, Marvin L.; and Moore, William M. Thermal engine system. 4,031,704, Cl. 60-325.000.

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Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, to Black and Decker Manufacturing Company, The. Sharpen twist drills or the like. 4,031,672, Cl. 51-288.000.

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Moran, Donald Martin, to Sperry Rand Corporation. Reconfigurable data bus. 4,032,893, Cl. 340-166.00R.

Morez, Eugene S.; and Moore, Douglas R., to Norlin Music, Inc. Integrated demultiplexing circuit with continuously variable outputs. 4,032,720, Cl. 179-15.00A.

Morf, Ernst: *See—*
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Morgan, Charles P.; and Lamy, Jean L., to Rockwell International Corporation. Control of positioning system authority over aircraft control surfaces as a function of surface movement rate. 4,032,094, Cl. 244-194.000.

Morgan, Idris Gareth: *See—*
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Morhenn, Vera B. Occlusive pessary. 4,031,886, Cl. 128-130.000.

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Mori, Mitsuhiro; Ito, Kazuhiro; Morioka, Makoto; and Ono, Yuichi, to Hitachi, Ltd. Light emitting semiconductor diode. 4,032,945, Cl. 357-18.000.

Mori, Shunro: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Mori, Shunro, 4,032,635.

Morin, Denise M.: *See—*
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Morioka, Makoto: *See—*
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Morita Pump Kabushiki Kaisha: *See—*
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Moriya, Masafumi; Hosoda, Kazuo; Takai, Makoto; and Mano, Shiro, to Miyoshi Yushi Kabushiki Kaisha. Process for producing chelating resin and product produced thereby. 4,032,482, Cl. 260-2.20R.

Moriya, Shoji: *See—*
Chibata, Ichiro; Miyoshi, Munetsugu; Takashima, Kohki; and Moriya, Shoji, 4,032,641.

Morris, Alfred Ray: *See—*
Hendricks, David Allen; Howe, Milton Albert, Jr.; Luck, Stephen Royall; Morris, Alfred Ray; and Owen, Dave Leslie, 4,032,038.

Morris, Max O. Corner joint brace characterized by a flexible construction. 4,032,242, Cl. 403-231.000.

Morrison, Howard J.; and Brand, Derek A., to Marvin Glass & Associates. Device for opening and closing of cord operated closures. 4,031,944, Cl. 160-331.000.

Morrison, Howard J.: *See—*
Keller, Albert G.; Nix, Donald F.; and Morrison, Howard J., 4,031,659.

Morse, Harold F. Game board apparatus. 4,032,151, Cl. 273-131.00B.

Morton, Douglas R., Jr., to Upjohn Company, The. Oxa phenylene prostaglandin analogs. 4,032,560, Cl. 260-473.00G.

Moser, Hans, to Ciba-Geigy Corporation. Haloacetanilides as microbicidal active substances. 4,032,657, Cl. 424-309.000.

Moser, Werner: *See—*
Imme, Helmut; and Moser, Werner, 4,031,734.

Moses, Ronald W., Jr.: *See—*
Boom, Roger W.; Moses, Ronald W., Jr.; Peterson, Harold A.; and Young, Warren C., 4,032,959.

Motorola, Inc.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,032,896.
En, John; and Leitich, Albert Joseph, 4,032,886.
Gemmell, Frank S.; and Fried, Mark A., 4,031,826.
Hargis, Robert Norman, 4,032,858.
McGee, Paul Dean, 4,032,725.
Nation, Melvin Stanley, 4,032,204.
Thome, Gene P., 4,032,963.

Moult, Roy H.: *See—*
Blommers, Elizabeth A.; and Moult, Roy H., 4,032,515.

Moustakas, Matthew A., to CBS Inc. Fishing game. 4,032,144, Cl. 273-86.00R.

Mowbray, John A., to Orlando, Agostino. Light attachment for a compact. 4,032,772, Cl. 240-6.45R.

Mower, Morris F.: *See—*
Johnson, Eugene R.; and Mower, Morris F., 4,032,283.

Muanyagipari Kutato Intezet: *See—*
Kecskemethy, Geza; Tihanyi, Robert; and Virag, Gyorgy, 4,032,040.

Mueller, Alvin W.; Williams, Robert J.; and Ansel, Robert E., to DeSoto, Inc. Composite baseball bat. 4,032,143, Cl. 273-72.00R.

Mueller, Thomas L.: *See—*
Malinski, S. W.; and Mueller, Thomas L., 4,031,941.

Mulee, Dennis L.: *See—*
Erbach, Arthur R.; Franck, Allen R.; Mulee, Dennis L.; and Schmitt, Wilhelm E., 4,032,743.

Muller-Deisig, Wolfgang; and Brauning, Egon, to Fehlbaum. Ergonomically designed chair. 4,032,190, Cl. 297-353.000.

Muller, Mathias: *See—*
Durr, Walter; and Muller, Mathias, 4,032,803.

Muller, Richard, to Gebr. Hofmann KG. Apparatus for balancing machines for chucking and centering of anaxial bodies of rotation. 4,031,760, Cl. 73-460.000.

Munch, Peter: *See—*
Dany, Franz-Josef; Wortmann, Joachim; Munch, Peter; and Vollmer, Hartfrid, 4,032,498.

Munk, Miner N., to Varian Associates. Liquid chromatography pumping system with compensation means for liquid compressibility. 4,032,445, Cl. 210-103.000.

Muramatsu, Kenji: *See—*
Kawai, Minoro; and Muramatsu, Kenji, 4,032,062.

Murat, Roger; and Glay, Guy, to Societe d'Applications Generales d'Electricite et de Mecanique S A G E M. Printing device. 4,031,992, Cl. 197-1.00R.

Murata, Takao; Nakamura, Nobutaka; and Goto, Tateo, to Sumitomo Durez Company, Ltd. Wax compositions for flame retardant electrical insulation coatings. 4,032,490, Cl. 260-28.00P.

Murnane, Thomas Joseph. Locking device for safety belt. 4,032,081, Cl. 242-107.40B.

Murphy, C. J. Adjustable sharpener for self-sharpening feed chopping knives. 4,031,670, Cl. 51-250.000.

Murty, Hari N., to Carborundum Company, The. Granular activated carbon manufacture from sub-bituminous coal mixed with concentrated inorganic acid without pitch. 4,032,476, Cl. 252-444.000.

Nabae, Akira; Shimamura, Takeo; Shimizu, Ichirou; and Kurosawa, Ryoichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Inverter apparatus. 4,032,831, Cl. 363-2.000.

Nadelson, Jeffrey, to Sandoz, Inc. Isoxazolyl benzoic acids. 4,032,644, Cl. 424-272.000.

Nagao, Taku: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,032,575.

Nagaoka, Tateki: *See—*
Katayama, Hajime; Nitanda, Hiroshi; Nagaoka, Tateki; Kishi, Hirotoshi; Takada, Yousaku; Iida, Noriyoshi; Inuzuka, Tsuneki; and Komiya, Yutaka, 4,032,137.

Nahory, Robert Edward: *See—*
De Winter, John Christian; Nahory, Robert Edward; and Pollack, Martin Alan, 4,032,951.

Nakajima, Hiromichi: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,032,575.

Nakamura, Hideki; and Kiyonaga, Kingo, to Hitachi Metals, Ltd. Carbide enriched high speed tool steel. 4,032,302, Cl. 75-240.000.

Nakamura, Kotaro: *See—*
Furutachi, Nobuo; Nakamura, Kotaro; Yamada, Minoru; and Arai, Atsuaki, 4,032,346.

Nakamura, Nobutaka: *See—*
Murata, Takao; Nakamura, Nobutaka; and Goto, Tateo, 4,032,490.

Nakamura, Takeshi, to Fuji Photo Film Co., Ltd. X-ray film cartridge. 4,032,790, Cl. 250-480.000.

Nakamura, Yoichi: *See—*
Ogihara, Sadahide; Nakamura, Yoichi; and Fukui, Osamu, 4,032,592.

Nakano, Seizo: *See—*
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Nakata, Tetsuya: *See—*
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Nalco Chemical Company: *See—*
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Napper, Jack C.: *See—*
Benavente, Vicente Cruz; and Napper, Jack C., 4,032,189.

Nassimbene, Ernie George, to International Business Machines Corporation. Palm print identification. 4,032,889, Cl. 340-146.30E.

Nation, Melvin Stanley, to Motorola, Inc. Adjustable mounting arrangement for electronic apparatus. 4,032,204, Cl. 312-7.00R.

National Board of Medical Examiners: *See—*
Pooley, Charles K., 4,032,897.

National Marine Service, Inc.: *See—*
Wright, David A.; and Walters, Chester H., 4,032,444.

National Research Development Corporation: *See—*
Joyce, Gordon Charles, 4,032,389.

National Research Institute for Metals: *See—*
Kametani, Hiroshi, 4,032,425.

National Semiconductor Corporation: *See—*
Ross, John P.; and Bernardi, Carl E., 4,032,422.

Nattefort, Fritz, to Precise Corporation, The. Rotating spindle and tool unit. 4,031,810, Cl. 90-11.00A.

Navarrete, Antonio E.: *See—*
Harper, Jon J.; Navarrete, Antonio E.; and Thomas, Richard J., 4,032,563.

Naydenov, Kubrat Vassilev: *See—*
Hadjiiliev, Ruscho Panayotov; Todorova, Maria Ivanova; Georgiev, Tzvetan Obretenov; Naydenov, Kubrat Vassilev; Jechev, Dinko Mihaylov; Staneva, Yanka Bogdanova; and Hadjiilieva, Irina Valcheva, 4,032,356.

NCR Corporation: *See—*
Koo, Tuh-Kai, 4,032,373.

Nelson, Robert C., to New River Manufacturing Company, Inc. Mobile telescopical articulated cascade conveyor system for mining and automatic self-tramming wheel-mounted conveyor unit therefor. 4,031,997, Cl. 198-301.000.

Neomed Incorporated: *See—*
Esty, Janet M.; and Taylor, Charles E., 4,032,738.

Neri, John E. Sink trap with clean out opening. 4,031,914, Cl. 137-247.510.

Neumann, Henning; and Federer, Fritz, to Metzeler Kautschuk AG. Inflatable boat. 4,031,580, Cl. 9-2.00A.

Neuroth, Robert J. Electric conduit connector. 4,032,178, Cl. 285-162.000.

New River Manufacturing Company, Inc.: *See—*
Nelson, Robert C., 4,031,997.

Newton, Albert Eugene: *See—*
Elliott, Richard Montgomery; Newton, Albert Eugene; and Kelley, John Sherburne, 4,032,046.

NGK Insulators, Ltd.: *See—*
Ohmura, Akira; and Wada, Shigetaka, 4,032,752.

Nichols, Dwight E., to Hoover Ball and Bearing Company. Bin with internal sloping walls. 4,032,048, Cl. 222-185.000.

Nichols, Walter W.: *See—*
Connolly, John E., 4,031,947.

Nicolaisen, Holger; and Tandrup, Leif Borge, to Danfoss A/S. Pivotal bearing for an omega spring. 4,032,128, Cl. 267-159.000.

Nicolaisen, Holger; and Andersen, Finn Schnoor, to Danfoss A/S. Supporting structure for leaf spring contact assembly. 4,032,739, Cl. 200-283.000.

Nicolas, Gerard, to Commissariat a l'Energie Atomique. Method and a device for the interconnection of electronic components. 4,031,612, Cl. 29-625.000.

Nicoson, Robert D.: *See—*
Wilson, Clyde E.; and Nicoson, Robert D., 4,032,282.

Nielsen, Leif, to Danfoss A/S. Thermostatic expansion valve for refrigeration installations. 4,032,070, Cl. 236-92.00B.

Nilson, Sven Arthur John, Jr.: *See—*
Roberts, Raymond P.; and Nilson, Sven Arthur John, Jr., 4,031,675.

Nilsson, Jan: *See—*
Larker, Hans; Lundblad, Erik; Lundback, Bertil; and Nilsson, Jan, 4,031,732.

Ninomiya, Satoshi: *See—*
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Nippon Kogaku K.K.: *See—*
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Nippon Telegraph and Telephone Public Corporation: *See—*
Hirade, Kenkichi; Hattori, Takeshi; and Wasai, Hiromi, 4,032,846.
Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, 4,032,924.

Nishimura, Akira: *See—*
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Nishizawa, Tsutomu: *See—*
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Nissan Motor Co., Ltd.: *See—*
Aibe, Tsuyoshi; Sugiura, Yoshiaki; and Okada, Yuzuru, 4,032,175.
Asano, Masaharu, 4,031,866.
Minakawa, Masaaki; and Yoshikawa, Toshio, 4,032,125.

Nitanda, Hiroshi: *See—*
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Nitro-Nobel A.B.: *See—*
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Nix, Donald F.: *See—*
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Nobusawa, Tsukumo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Automatic shutter controls for cameras. 4,032,932, Cl. 354-23.00D.

Noll, Stanley Darwin; and Delfeld, William F., to Production Experts, Inc. Billet conveyor and turner. 4,032,019, Cl. 214-1.0QG.

Norco, Inc.: *See—*
Metz, Joseph R., 4,031,765.

Norlin Music, Inc.: *See—*
Morez, Eugene S.; and Moore, Douglas R., 4,032,720.

North American Philips Corporation: *See—*
Kenney, George Churchill; and Hoogendijk, Adrianus Huibert, 4,032,966.

Van Roessel, Frederik Johannes, 4,032,974.
Northern Telecom Limited: *See—*
Kos, Steven, 4,032,925.
Northrop, Donald P.: *See—*
Shurgan, Joel; and Northrop, Donald P., 4,032,813.
Shurgan, Joel; and Northrop, Donald P., 4,032,814.
Novello, Frederick C.: *See—*
Baldwin, John J.; and Novello, Frederick C., 4,032,522.
Nowicki, Henry: *See—*
Lu, Shau-Zou; and Nowicki, Henry, 4,031,912.
Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, to RCA Corporation. Method of assembling a mount assembly in the neck of a cathode-ray tube. 4,031,597, Cl. 29-25.160.
Numerowski, Kenneth J., to U.I.P. Engineered Products Corporation. Roofing shingle mineral filler heater. 4,032,288, Cl. 432-189.000.
Nuova San Giorgio S.p.A.: *See—*
Roehrich, Christian, 4,031,691.
Nuovo Pignone, S.p.A.: *See—*
Santucci, Nicola, 4,031,925.
N.V. Industrieele Handelscombinatie Holland: *See—*
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O & K Orenstein & Koppel Aktiengesellschaft: *See—*
Graf, Wilfried, 4,032,016.
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Amerine, James Dalton, 4,032,074.
Oak Industries Inc.: *See—*
Golbeck, Bernard J.; Lewandowski, Raymond F.; and Kennedy, Maurice E., 4,032,730.
Obata, Shizuo; Yamato, Yukiomi; and Taniguchi, Hitoshi, to Fuji Oil Company, Ltd. Method of manufacturing edible soy protein-containing, dried meat product. 4,032,666, Cl. 426-242.000.
Obeda, Edward G., to Branson Ultrasonics Corporation. Method and apparatus for splicing thermoplastic monofilament material by high frequency vibratory energy. 4,032,382, Cl. 156-73.200.
Oberster, Arthur Eugene: *See—*
Koch, Russell William; and Oberster, Arthur Eugene, 4,032,500.
Oberteuffer, John A.: *See—*
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O'Brien, Stephen Michael: *See—*
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Ocean Ecology Ltd.: *See—*
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Oda, Takeshi: *See—*
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Oelsch, Jurgen, to Olympia Werke AG. Push button switch. 4,032,728, Cl. 200-5.00A.
Ogawara, Hiroshi: *See—*
Onoda, Koji; Matsumoto, Atsuyuki; Ogawara, Hiroshi; and Nishimura, Akira, 4,032,485.
Ogihara, Sadahide; Nakamura, Yoichi; and Fukui, Osamu, to UBE Industries, Ltd. Method for the preparation of a modified crystalline propylene polymer. 4,032,592, Cl. 260-827.000.
Ohba, Shinya; Takemoto, Iwao; and Kubo, Masaharu, to Hitachi, Ltd. Bulk charge transfer semiconductor device. 4,032,952, Cl. 357-24.000.
Ohmura, Akira; and Wada, Shigetaka, to NGK Insulators, Ltd. Heating elements comprising a PTC ceramic article of a honeycomb structure composed of barium titanate. 4,032,752, Cl. 219-541.000.
Ohota, Yutaka: *See—*
Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, 4,032,924.
Oike, Yozo: *See—*
Iida, Yoshihisa; and Oike, Yozo, 4,031,781.
Oishi, Kazuaki; Nakano, Seizo; and Suda, Shouetu, to Hitachi, Ltd. Horizontal double plane high voltage switching assembly. 4,032,820, Cl. 361-333.000.
Oka, Shunzo: *See—*
Minami, Shunji; Takemura, Takehide; and Oka, Shunzo, 4,032,838.
Okada, Yuzuru: *See—*
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Okamura, Masami; Aoki, Fumio; Sano, Yoshihiro; Makino, Jun-ichi; Miki, Yoshiteru; Sasaki, Hiroshi; and Seo, Kazuo, to Hitachi, Ltd.; and Tokyo Electric Power Co., Inc., The. Coding equipment providing compressed code. 4,032,913, Cl. 340-347.0AD.
Okazaki, Yasushi: *See—*
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Okumura, Akio: *See—*
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Okutsu, Kazuhisa: *See—*
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Okutsu, Masaru: *See—*
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Oldham, Guy Franklin, to British Petroleum Company Limited, The. Effluent treatment process. 4,032,439, Cl. 210-17.000.
Olifant, Jacques: *See—*
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Olin Corporation: *See—*
Gay, Walter A., 4,032,617.
Kadija, Igor V., 4,032,427.
Tepas, Joseph J., Jr.; and Sangster, Arlon G., 4,032,035.
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Olsen, Roderick, Jr.: *See—*
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Olsson, Gotthard Valentin, to Telefonaktiebolaget L M Ericsson. Method of joining of insulated high-voltage cables. 4,032,380, Cl. 156-49.000.
Olympia Werke AG: *See—*
Oelsch, Jurgen, 4,032,728.
Omelich, David M.: *See—*
Davis, James E. P.; and Omelich, David M., 4,031,885.
Onada, Takeru; and Tomita, Shinpei, to Mitsubishi Chemical Industries Ltd. Process for preparing dicyan. 4,032,620, Cl. 423-384.000.
Onal, Hasan F.; and Harmon, Clarence R., to Hydro-Tech Corporation. Dual jet boat pump. 4,031,844, Cl. 115-12.00R.
O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Four-wire integrable hybrid. 4,032,718, Cl. 179-15.0AA.
Onghena, Jozef Jan: *See—*
Vermeylen, Rene Leonard; and Onghena, Jozef Jan, 4,032,284.
Onishi, Takanori; and Shiozawa, Ken, to Toyota Jidosha Kogyo Kabushiki Kaisha. Ignition-timing adjusting system for spark-ignition internal combustion engines. 4,031,869, Cl. 123-117.00A.
Onishi, Yasuhiko: *See—*
Hokkoku, Shusaburo; and Onishi, Yasuhiko, 4,032,488.
Ono, Yuichi: *See—*
Mori, Mitsuhiro; Ito, Kazuhiro; Morioka, Makoto; and Ono, Yuichi, 4,032,945.
Onoda, Koji; Matsumoto, Atsuyuki; Ogawara, Hiroshi; and Nishimura, Akira, to Miyoshi Yushi Kabushiki Kaisha. Polyurethane foams based on mixed itaconic acid polyesters. 4,032,485, Cl. 260-2.5AN.
Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for converting cyclohexane to adipic acid. 4,032,569, Cl. 260-533.00C.
Oppel, John A.; and Phillips, Virgel E., to General Electric Company. Electric circuit breaker with electromagnetic-assist means for opposing magnetic contact-separating forces. 4,032,870, Cl. 335-195.000.
O'Rell, Michael K.: *See—*
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Ortloff, John E.; Arcache, Alfred S.; and Haring, Robert E., to Exxon Production Research Company. Articulated riser. 4,031,919, Cl. 137-799.000.
Osaka Soda Co., Ltd.: *See—*
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Osberghaus, Rainer, to Henkel & Cie G.m.b.H. Skin treating agent containing polyaldehydopolycarboxylate polymers and process. 4,032,629, Cl. 424-78.000.
Osberghaus, Rainer; Umbach, Wilfried; Gloxhuber, Christian; and Braig, Siegfried, to Henkel & Cie G.m.b.H. Skin treating agent containing polyhydroxypolycarboxylate polymers and process. 4,032,630, Cl. 424-81.000.
Osberghaus, Rainer: *See—*
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Oscarson, John R.: *See—*
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Oscarsson, Rolf Arne; and Wyeth, Nathaniel Convers, to Du Pont de Nemours, E. I., and Company. Exposure registry apparatus. 4,032,233, Cl. 355-91.000.
Oskin, Viktor Semenovich: *See—*
Solomatin, Anatoly Vasilievich; Evseev, Anatoly Grigorievich; Ponomarev, Ardalion Nikolaevich; Oskin, Viktor Semenovich; and Talroze, Viktor Lvovich, 4,032,606.
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Otrhalek, Joseph V.; Gomes, Gilbert S.; and Gansser, Robert E., to

BASF Wyandotte Corporation. Acid cleaner and process for disposal thereof. 4,032,466, Cl. 252-136.000.

Owen, Dave Leslie: *See—*
Hendricks, David Allen; Howe, Milton Albert, Jr.; Luck, Stephen Royall; Morris, Alfred Ray; and Owen, Dave Leslie, 4,032,038.

Owen, Hartley, to Mobil Oil Corporation. Conversions of hydrocarbons. 4,032,432, Cl. 208-70.000.

Owens-Illinois, Inc.: *See—*
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Oy Stromberg AB: *See—*
Panu, Kalevi, 4,032,837.

Ozaki, Shoichiro; and Mori, Haruki, to Mitsui Toatsu Chemicals, Incorporated. 1-Carbamoyl-5-fluorouracil derivatives. 4,032,524, Cl. 260-256.40C.

Ozawa, Shinji, to Mikuni Kogyo Co., Ltd. Fuel charge injection apparatus for internal combustion engines. 4,031,870, Cl. 123-119.00R.

Paap, Hans J.; Arnold, Dan M.; Schultz, Ward E.; and Smith, Harry D., Jr., to Texaco Inc. Behind casing water volume flow rate measurement using gamma ray spectral degradation. 4,032,778, Cl. 250-266.000.

Paap, Hans J.; Arnold, Dan M.; and Peelman, Harold E., to Texaco Inc. Behind casing water flow detection using continuous oxygen activation. 4,032,780, Cl. 250-266.000.

Paap, Hans J.: *See—*
Arnold, Dan M.; and Paap, Hans J., 4,032,779.

Pacific Gunsight Company: *See—*
Boschi, Richard C., 4,031,804.

Paletto, Raimondo, to SGS-ATES Componenti Elettronici S.p.A. Resin-encased microelectronic module. 4,032,706, Cl. 174-52.0PE.

Pall Corporation: *See—*
Pall, David B., 4,032,688.

Pall, David B., to Pall Corporation. Seamless tubular nonwoven webs and filters thereof. 4,032,688, Cl. 428-36.000.

Paluck, George. Apparatus for establishing a level plane. 4,031,629, Cl. 33-290.000.

Pan, Jing Jong; and Arnold, Milton Phillip, to Harris Corporation. Reduction of intermodulation. 4,032,802, Cl. 307-311.000.

Panu, Kalevi, to Oy Stromberg AB. Current transformer. 4,032,837, Cl. 323-6.000.

Papantoniou, Christos; and Handjani, Rose-Marie, to Societe Anonyme dite: L'Oreal. Cosmetic emulsion compositions including black polymer emulsifiers. 4,032,628, Cl. 424-63.000.

Papst, Hermann E. R. Dirigible, especially non-rigid dirigible. 4,032,085, Cl. 244-30.000.

Parduhn, Alfred P.; and Cecil, Waldo E. Articulated highway delineator post. 4,032,248, Cl. 404-10.000.

Pareja, Ramon, to Lear Siegler, Inc. Pump with coaxial inlet and outlet valve arrangement. 4,032,263, Cl. 417-539.000.

Parham, J. P. Solar energy conversion plant. 4,031,879, Cl. 126-271.000.

Parker, Duane L.: *See—*
Krolak, Ronald L.; and Parker, Duane L., 4,031,968.

Parker, Roger Alan, to Richardson-Merrell Inc. Substituted thenoylacetic acid and esters. 4,032,647, Cl. 424-275.000.

Parker, Wesley A.; Gwyn, John E.; and McCullough, Glenn R., to Shell Oil Company. Oxygen-containing gas distribution apparatus employed in fluidized bed regeneration of carbon-contaminated catalysts. 4,032,300, Cl. 23-288.00B.

Parkinson, Graham Charles; and Fordyce, Homer E., to Marley Cooling Tower Company, The. Hot water supply and distribution structure for cooling towers. 4,032,604, Cl. 261-111.000.

Parks, John H., to Caterpillar Tractor Co. Low stress cam roller. 4,031,777, Cl. 74-569.000.

Parkyn, Derek John; and Keuleman, Alexander Hendrich Francis, to U.S. Philips Corporation. Automotive starter lockout system. 4,032,792, Cl. 290-37.00R.

Parshin, Alexei Nikolaevich: *See—*
Komarov, Jury Ivanovich; Parshin, Alexei Nikolaevich; and Gorbunova, Ljubov Yakovlevna, 4,031,927.

Pascual, Miguel, to Hercules Incorporated. Oriented film of stereoregular polypropylene composition. 4,032,493, Cl. 260-28.50A.

Paul, Stanley C.; and Russell, Shelby J. Tattoo etching machine. 4,031,783, Cl. 81-9.220.

Pearsall, Thomas J.: *See—*
Karaba, Albert M.; Brouwers, Alexander P.; and Pearsall, Thomas J., 4,031,868.

Pecile, Dario C.: *See—*
Auzel, Francois F.; Morin, Denise M.; and Pecile, Dario C., 4,032,351.

Peddle, Charles: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,032,896.

Peden, John Richard; and Santillo, Derek Vivian Ivor. Power operated chuck. 4,032,161, Cl. 279-1.00H.

Pedersen, Vernon G.: *See—*
Bohmrich, Jack L.; Bowden, William A., Jr.; and Pedersen, Vernon G., 4,032,311.

Pedone, Vito S. Reusable oil absorbent bilge and fuel tank opening pads. 4,031,839, Cl. 114-270.000.

Pedone, Vito S. Oil-water separator. 4,032,453, Cl. 210-266.000.

Peelman, Harold E.: *See—*
Paap, Hans J.; Arnold, Dan M.; and Peelman, Harold E., 4,032,780.

Pennino, Frank L.: *See—*
Kuenzig, Ernest O.; and Pennino, Frank L., 4,032,278.

Pennsylvania Engineering Corporation: *See—*
Ziegler, Joseph, 4,032,119.

Pennwalt Corporation: *See—*
Zwettler, Ernest, 4,032,943.

Pepin, Francis Joseph Antoine, to Societe Nouvelle des Acieries de Pampey. Ingot casting mould in particular for ferromanganese. 4,032,104, Cl. 249-114.000.

Perchonock, Carl D.: *See—*
Groves, William G.; Loev, Bernard; and Perchonock, Carl D., 4,032,656.

Perego, Giovanni: *See—*
Dozzi, Giovanni; Perego, Giovanni; and Busetto, Carlo, 4,032,553.

Perfetti, Guido A.; and Darlington, Henry, to Bethlehem Steel Corporation. Coated sheet metal and method of forming products therefrom. 4,032,678, Cl. 427-388.00A.

Perkin-Elmer Corporation, The: *See—*
Huchital, David A.; and Steinberg, George N., 4,032,862.
Kiefer, Hans Walter; Riethmuller, Lothar Herbert; and Spreitzhofer, Ernst Gunther Robert, 4,032,235.

Permeator Corporation: *See—*
Henderson, James H., 4,031,959.

Pernegger, Wolfgang: *See—*
Helder, Johan; Holzinger, Karl; Guegel, Gerd; Liebler, Heinz; and Pernegger, Wolfgang, 4,032,414.

Perrault, Frederick; and Perrault, Raymond E. Curved bracket adapter. 4,032,096, Cl. 248-73.000.

Perrault, Raymond E.: *See—*
Perrault, Frederick; and Perrault, Raymond E., 4,032,096.

Perrier, Dorothy M.; Benerito, Ruth R.; and Steele, Richard H., to United States of America, Agriculture. Preparation of stable strong base cellulosic anion exchangers with red-ox potentials. 4,032,293, Cl. 8-129.000.

Perronin, Jean; and Dessaint, Andre Louis, to Produits Chimiques Ugine Kuhlmann. Water-repellent and oil-repellent compositions based on fluorine compound. 4,032,495, Cl. 260-29.60F.

Persyn, Harvey O., to Ralston Purina Company. Artificial insemination of shrimp. 4,031,855, Cl. 119-2.000.

Perthes, Horst, to Kalle Aktiengesellschaft. Movable copy board for reproduction apparatus. 4,032,232, Cl. 355-75.000.

Peters, Edward J.; and Zeman, Wayne P., to Diamond Shamrock Corporation. Electrical current breaker for fluid stream. 4,032,424, Cl. 204-258.000.

Peters, Joseph Jerome; Villanueva, Antonio Tong; and Keller, Robert Samuel, to Societe d'Assistance Technique pour Produits Nestle S.A. Cheese product and process for production. 4,032,669, Cl. 426-573.000.

Petersen, Sigrud R.: *See—*
Finnell, Leonard W.; Petersen, Sigrud R.; and Gorden, Dale I., 4,032,835.

Peterson, C. Lynn, to Peterson Filters and Engineering Company. By-pass and synchronized blow system and method for rotary vacuum filters. 4,032,442, Cl. 210-82.000.

Peterson, Carl R., to Rapidex, Inc. Boring apparatus capable of boring straight holes. 4,031,974, Cl. 175-334.000.

Peterson Filters and Engineering Company: *See—*
Peterson, C. Lynn, 4,032,442.

Peterson, Harold A.: *See—*
Boom, Roger W.; Moses, Ronald W., Jr.; Peterson, Harold A.; and Young, Warren C., 4,032,959.

Peterson, John A., to Hooker Chemicals & Plastics Corporation. Electrolytic processes. 4,032,417, Cl. 204-98.000.

Petri, Larry W.; and Conway, John E., to UOP Inc. Hydrorefining asphaltenic petroleum charge stocks. 4,032,433, Cl. 208-112.000.

Petrich, Grete: *See—*
von Plessen, Helmold; and Petrich, Grete, 4,032,622.

Petro-Tex Chemical Corporation: *See—*
Arganbright, Robert P.; and Bowman, William G., 4,032,583.
Cooley, Stone D.; Arganbright, Robert P.; Bowman, William G.; and Henery, James D., 4,032,458.

Petrolite Corporation: *See—*
Buriks, Rudolf S.; Fauke, Allen R.; and Mange, Franklin E., 4,032,514.

Petry, Eduard C.; and Stielow, John R., to Speedaddress, Inc. Method of making an address master card set. 4,032,385, Cl. 156-252.000.

Petty, Preston L. Hand grip. 4,031,775, Cl. 74-551.900.

Peuzin, Jean Claude: *See—*
Coeure, Philippe; Jadot, Jean Pierre; and Peuzin, Jean Claude, 4,032,217.

Pevi Aparelhos S.A.: *See—*
Arguelles, Victor Victoriano, 4,032,981.

Peyton, John J. Internal gripper apparatus. 4,032,185, Cl. 294-97.000.

Pfizer Inc.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; Routien, John B.; Shibakawa, Riichiro; and Tone, Junsuke, 4,032,631.
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Jefferson, Mark T.; Shibakawa, Riichiro; and Tone, Junsuke, 4,032,632.

Philip A. Hunt Chemical Corporation: *See—*
Czirr, David L.; and Kroll, Harry, 4,032,379.

Philipps, Armin: *See—*
Schonfeld, Wolfram; Philipps, Armin; and Runkel, Fritz, 4,031,738.

Phillips, Edwin D. Sealing means for stirring apparatus. 4,032,118, Cl. 259-122.000.

Phillips Petroleum Company: *See—*
Coale, Harold D., 4,032,683.
Hutchinson, William Milton, deceased, 4,032,467.
Phillips, Ronald Wayne, II, to B. F. Goodrich Company, The. Inflatable emergency equipment deployment device. 4,031,583, Cl. 9-14.000.
Phillips, Virgel E.: *See—*
Oppel, John A.; and Phillips, Virgel E., 4,032,870.
Phillipson, Alan: *See—*
Spiller, Basil Harry Royston; and Phillipson, Alan, 4,032,610.
Piat, Moise. Apparatus for computing and metering liquid discharges. 4,032,042, Cl. 222-20.000.
Piche, Ernest. Tenon cutting machine with circular saws. 4,031,933, Cl. 144-198.00R.
Pickering, Harold W.: *See—*
Pickering, Phillip A.; and Pickering, Harold W., 4,032,186.
Pickering, Phillip A.; and Pickering, Harold W. Convertible truck cover. 4,032,186, Cl. 296-100.000.
Pickett, Oscar A., Jr.; and Stoddard, John W., to Monsanto Company. Phosphorus-containing copolyamides and fibers thereof. 4,032,517, Cl. 260-78.00R.
Pietryk, Helen C.: *See—*
Hegarty, Charles Paul; and Pietryk, Helen C., 4,032,659.
Pietsch, Wolfgang B., to Midrex Corporation. Binder composition. 4,032,352, Cl. 106-78.000.
Pike, William Floyd. Power operated aspirating hypodermic syringe. 4,031,889, Cl. 128-215.000.
Pillar, Walter O., to ARCO Polymers, Inc. Heat stabilizers for expandable styrene polymers. 4,032,481, Cl. 260-2.5FP.
Pitney-Bowes, Inc.: *See—*
Gurgens, Rainer Eberhard; and Schottle, Helmut August Michael, 4,031,993.
Planck, Jane S. Headdress. 4,031,567, Cl. 2-204.000.
Plank, Don A.: *See—*
Floyd, Joseph C.; and Plank, Don A., 4,032,510.
Plegat, Alain Edouard, to Societe Anonyme des Usines Chausson. Method using a soldering alloy for connecting parts of which at least some are made of aluminium. 4,032,059, Cl. 228-183.000.
Plempel, Manfred: *See—*
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, 4,032,636.
Plummer, Dexter Robert: *See—*
Stanwell-Smith, Colin Howard; Plummer, Dexter Robert; Easthope, Frederick James; and Pope, Jonathan Humfrey, 4,032,158.
Podowski, Robert R., to Zenith Radio Corporation. Signal transmitter using an active thick film substrate. 4,032,891, Cl. 340-148.000.
Poggemiller, Erhard; and Sweet, Ralph. Depth control device for ground working agricultural implements. 4,031,963, Cl. 172-4.000.
Pohl, Walter, to Texas Instruments Incorporated. Locking device for washing machine door. 4,032,180, Cl. 292-341.160.
Pohlig-Heckel-Bleichert Vereinigte Maschinenfabriken Aktiengesellschaft: *See—*
Hirt, Peter Klaus; and Switzeny, Kurt, 4,031,830.
Poittevin, Andre; and Torelli, Vesperto, to Roussel-UCLAF. Novel thiazole derivatives. 4,032,643, Cl. 424-270.000.
Polaroid Corporation: *See—*
Borror, Alan L., 4,032,545.
Douglas, Lawrence M.; Finelli, Patrick L.; Staller, Norman D.; and Slavitter, Frederick, 4,032,941.
Greenwald, Richard B., 4,032,538.
Johnson, Bruce K.; and Hendry, Donald H., 4,032,936.
Wray, William R., 4,032,224.
Wright, Joseph H., 4,032,937.
Pollack, Martin Alan: *See—*
De Winter, John Christian; Nahory, Robert Edward; and Pollack, Martin Alan, 4,032,951.
Pollock, William Hunter, to Combustion Engineering, Inc. Pulverized coal fired package boiler. 4,031,861, Cl. 122-327.000.
Polsfuss, Terrance E.: *See—*
Johnson, David E.; and Polsfuss, Terrance E., 4,032,289.
Poly San Corporation: *See—*
Harding, George W., 4,031,572.
Poly Seal, Inc.: *See—*
Zitting, Gordon T., 4,032,159.
Pomfret, Edward E., to Gillette Company, The. Shaving system. 4,031,620, Cl. 30-346.570.
Ponciano, Jose; and Bautista, Thomas S. Aerodynamic sound-emitting amusement device. 4,031,655, Cl. 46-52.000.
Pond, Stephen F.; and Faucz, Eugene C., to Xerox Corporation. Thermomagnetic imaging apparatus. 4,032,923, Cl. 346-74.100.
Ponomarev, Ardalion Nikolaevich: *See—*
Solomatin, Anatoly Vasilievich; Evseev, Anatoly Grigorievich; Ponomarev, Ardalion Nikolaevich; Oskin, Viktor Semenovich; and Talroze, Viktor Lvovich, 4,032,606.
Pooley, Charles K., to National Board of Medical Examiners. Interactive audiovisual display system. 4,032,897, Cl. 364-900.000.
Pope, Jonathan Humfrey: *See—*
Stanwell-Smith, Colin Howard; Plummer, Dexter Robert; Easthope, Frederick James; and Pope, Jonathan Humfrey, 4,032,158.
Popeil Brothers, Inc.: *See—*
Popeil, Samuel Joseph, 4,031,650.
Popeil, Samuel Joseph, to Popeil Brothers, Inc. Retractable net. 4,031,650, Cl. 43-12.000.
Porter, Robert E. Syringe assembly package. 4,031,895, Cl. 128-272.100.
Possum Controls Limited: *See—*
Rogers, Peter, 4,031,644.
Post Office, The: *See—*
Allen, Edgar Robert, 4,032,716.
Harding, John Patrick; Butler, David Sydney; and Whitehead, Graham Keith, 4,031,735.
Potain Poclain Materiel (P.P.M.): *See—*
Lambert, Bernard Lucien, 4,031,976.
Potoski, John R.: *See—*
Freed, Meier E.; and Potoski, John R., 4,032,639.
Potter, Richard A.: *See—*
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PPG Industries, Inc.: *See—*
Cunningham, Hugh, 4,032,423.
Prats, Michael: *See—*
Drinkard, Gary; Prats, Michael; and O'Brien, Stephen Michael, 4,032,193.
Pray, R. Chester: *See—*
Soderlund, Martin I.; and Pray, R. Chester, 4,032,290.
Precise Corporation, The: *See—*
Nattefort, Fritz, 4,031,810.
Precision Screen Machines Inc.: *See—*
Jaffa, David, 4,031,825.
Preston, Beryl Margaret: *See—*
Gregory, Harold; and Preston, Beryl Margaret, 4,032,633.
Preuss, Robert K.: *See—*
Yarwood, John C.; Dore, James E.; and Preuss, Robert K., 4,032,124.
Price, George M., to Frymaster Corporation, The. Frying apparatus with compensated thermostat. 4,032,749, Cl. 219-442.000.
Prichard, Evan S., to Challenge-Cook Bros., Incorporated. Mixer attachment for mining vehicles. 4,032,116, Cl. 259-69.000.
Priese, Werner K.: *See—*
Flynn, Jac B.; Janquart, Jerry C.; and Priese, Werner K., 4,032,044.
Prochnow, Rudolf, to Robert Bosch Fernsehanlagen G.m.b.H. Scanning device for the recording and/or play-back of wide-band signals. 4,032,986, Cl. 360-130.000.
Procter & Gamble Company, The: *See—*
Huff, Bernice, 4,031,568.
Production Control Units, Inc.: *See—*
Bruce, Ralph E., 4,032,041.
Production Experts, Inc.: *See—*
Noll, Stanley Darwin; and Delfeld, William F., 4,032,019.
Production Specialties, Inc.: *See—*
Herbert, Gerald P.; McGinn, Ferdinand M.; and Embree, Hugh D., 4,031,954.
Produits Chimiques Ugine Kuhlmann: *See—*
Perronin, Jean; and Dessaint, Andre Louis, 4,032,495.
Promecam Sisson-Lehmann: *See—*
Cailloux, Paul, 4,031,737.
Provencher, Joseph H., to United States of America, Navy. Multibeam adaptive array. 4,032,922, Cl. 343-854.000.
Psarras, Theodore; and Tamborski, Christ, to United States of America, Air Force. Omega-carbomethoxyperfluoroalkylene oxide iodides. 4,032,566, Cl. 260-484.00R.
Pulak, Richard P., to UOP Inc. Spent catalyst regeneration apparatus with internal regenerated-catalyst recycle means. 4,032,299, Cl. 23-288.00B.
Purdue Research Foundation: *See—*
Hall, Randall C., 4,032,296.
Puritan-Bennett Corporation: *See—*
Davis, James E. P.; and Omelich, David M., 4,031,885.
Pusche, Herbert: *See—*
Kuxdorf, Bernhard; Pusche, Herbert; Erpenbach, Heinz; and Riechmann, Wernfried, 4,032,410.
Puttinger, Dietmar; and Fischer, Manfred, to Messerschmitt-Boelkow-Blohm GmbH. Apparatus for ejecting a transport and launching container from a missile launcher. 4,031,805, Cl. 89-1.50G.
Pyzel, Ewald D.; and Codding, Harold E., to Ski Safe Inc. Touring ski boot binding. 4,032,172, Cl. 280-615.000.
Qonaar Corporation: *See—*
Malott, Steve, 4,031,991.
Quadbeck-Seeger, Hans-Juergen; and Hoch, Helmut, to BASF Aktiengesellschaft. Production of 2-hydroxynaphthalene-3-carboxylic acid. 4,032,568, Cl. 260-520.00A.
Quadbeck-Seeger, Hans-Juergen; and Schneider, Dieter, to BASF Aktiengesellschaft. Manufacture of 2-amino-3,5-dinitrobenzamide. 4,032,571, Cl. 260-558.00A.
Quarton, William T.; and Lowe, Peter R., to Honeywell Inc. Phosphor protection for X-Y loops. 4,032,760, Cl. 235-151.000.
Quayle, Jackson C. Pole top extension bracket. 4,032,244, Cl. 403-286.000.
Quin, Murray L.: *See—*
Bobrick, Mitchell; Quin, Murray L.; and Buzan, Morris M., 4,032,775.
R B Toy Development Co.: *See—*
Kupperman, Sam; and Kupperman, Dennis I., 4,031,656.
Raag, Valvo, to Syncal Corporation. Low power high voltage thermopile. 4,032,363, Cl. 136-211.000.
Raeymaekers, Alfons H. M.; and Van Gelder, Jozef H. L., to Janssen Pharmaceutica N.V. (1H-Benzimidazol-2-yl)carbamates. 4,032,536, Cl. 260-309.200.
Rakovsky, Oscar. Thermoplastic tubular container forming apparatus. 4,032,281, Cl. 425-392.000.

Raleigh, Roger W. Adjustable muffler for model aircraft type engines. 4,031,979, Cl. 181-69.000.

Ralston Purina Company: *See—*
Miller, Timothy Allen; and Hansen, Carlo J., 4,032,665.
Persyn, Harvey O., 4,031,855.

Ramsey Corporation: *See—*
McCormick, Harold E., 4,032,672.

Rand, J. Patrick. Inflatable tent. 4,031,674, Cl. 52-2.000.

Rank Xerox Ltd.: *See—*
Williams, Geoffrey C., 4,032,225.

Ranzanigo, Pierluigi, to Bassani S.p.A. Cartridge fuse carrier assembly. 4,032,878, Cl. 337-228.000.

Rapidex, Inc.: *See—*
Peterson, Carl R., 4,031,974.

Rapistan, Incorporated: *See—*
Suzuki, Shin; Uesugi, Masami; and Sekine, Michi, 4,031,998.

Raschke, Josef. Carton handling apparatus. 4,031,817, Cl. 93-44.10R.

Ratcliffe, Ronald W.: *See—*
Christensen, Burton G.; and Ratcliffe, Ronald W., 4,032,521.

Rauch, Keith: *See—*
Stastny, Edwin; Rauch, Keith; and Young, Ronald, 4,031,634.

Rausch, Richard E., to UOP Inc. Conversion of hydrocarbons with a superactive acidic bimetallic catalytic composite. 4,032,434, Cl. 208-139.000.

Rauscher, David A., to Cable Conveyor Systems, Inc. Method of making a conveyor belt. 4,032,384, Cl. 156-137.000.

Raville, Clarence A. Handgun apparatus. 4,031,808, Cl. 89-163.000.

Ravnsborg, Norman T.: *See—*
Blum, Kenneth J.; Dodson, Floyd; Jarrett, Robert P.; and Ravnsborg, Norman T., 4,032,287.

Ravussin, Pierre, to Alcyon Electronique et Physique S.A. Tri dimensional fluid flow sensing device. 4,031,755, Cl. 73-189.000.

Raychem Corporation: *See—*
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Raymond International Inc.: *See—*
Kuntz, Howard W., 4,031,687.

Raymond Lee Organization, Inc., The: *See—*
Douglass, Robert J., 4,032,447.
Kelley, John J., 4,031,909.
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Constant, Jennifer; Shanks, Ian Alexander; and Raynes, Edward Peter, 4,032,219.

Raytheon Company: *See—*
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RCA Corporation: *See—*
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Bloom, Allen; Bartolini, Robert Alfred; and Weakliem, Herbert Alfred, 4,032,340.
Bloom, Allen; and Hung, Ling Kong, 4,032,470.
Gange, Robert Allen, 4,032,338.
Harwood, Leopold Albert, 4,032,967.
Henley, Michael Lee; and Smith, Lawrence Edward, 4,032,819.
Hoover, Merle Vincent, 4,032,851.
Hulls, Leonard Robin; and Hadden, Stephen Clow, 4,032,852.
Kratz, Jerrold Kerwin; and Christensen, Edward Walter, II, 4,032,872.
Levine, Peter Alan, 4,032,976.
Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, 4,031,597.
Weimer, Paul Kessler, 4,032,903.

Read, Randol R.: *See—*
Shanks, John L.; Read, Randol R.; and Supernaw, John W., 4,032,915.

Recht, Heinz, to Deutsche Babcock & Wilcox Aktiengesellschaft. Arrangement for reducing the nox content of fluid gases. 4,031,860, Cl. 122-240.00B.

Recognition Equipment Incorporated: *See—*
White, John T.; and Lovelady, Kenneth T., 4,032,928.

Reddy, Thomas J., to Reddy, Thomas J., Trustee. Fuel line evacuation system. 4,032,091, Cl. 244-135.00R.

Reddy, Thomas J., Trustee: *See—*
Reddy, Thomas J., 4,032,091.

Redshaw, Charles G. Spherical Stirling engine. 4,031,703, Cl. 60-519.000.

Reed & Associates, Inc.: *See—*
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Reed, Buckley R., to Reed & Associates, Inc. Automatic lifting and lowering mechanism for deep fryers. 4,031,820, Cl. 99-336.000.

Reeher, John R.: *See—*
Smith, Ronald D.; Fies, William J.; Reeher, John R.; and Story, Michael S., 4,032,782.

Reen, Orville, to Allegheny Ludlum Industries, Inc. Sintered liquid phase stainless steel. 4,032,336, Cl. 75-224.000.

Rees, Thomas C.; and Flores, Robert J., to Sherwin-Williams Company, The. Easy dispersing alkali blue powder and process for manufacture. 4,032,357, Cl. 106-288.00Q.

Reid, Floyd F. Door lock. 4,031,725, Cl. 70-107.000.

Reinhardt, Horst; and Hoger, Ernst, to Kraftwerk Union Aktiengesellschaft. Telescopic device. 4,032,240, Cl. 403-108.000.

Reinshagen, Hellmuth: *See—*
Egger, Helmut; and Reinshagen, Hellmuth, 4,032,530.

Reisinger, Konrad; and Holzl, Ludwig, to Siemens Aktiengesellschaft. Circuit arrangement for lengthening a stop element at the receiver in a character-frame-governed time division multiplex data transmission system. 4,032,709, Cl. 178-50.000.

Reiss, Oscar; Brynes, Leon R.; and De Cicco, Frank, to APL Corporation. Safety cap. 4,032,028, Cl. 215-217.000.

Reitz, Rex L.: *See—*
Johnson, Frederick M.; Brown, James R.; and Reitz, Rex L., 4,032,689.

Renirie, Alexis C. M., to Vitatron Medical B.V. Long life cardiac pacer with switching power delivery means and method of alternately delivering power to respective circuit portions of a stimulus delivery system. 4,031,899, Cl. 128-419.0PS.

Renkert, J. Steven, to Metropolitan Industries. Prefabricated building panel and method of making. 4,031,682, Cl. 52-434.000.

Research Corporation: *See—*
Bernstein, Elliot R., 4,032,419.
Subramanian, Gopal; and McAfee, John Gilmore, 4,032,625.
Willett, James D.; and Cheek, Luther Michael, 4,032,551.

Reynolds Metals Company: *See—*
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Rhone-Poulenc Industries: *See—*
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Rhone-Poulenc-Textile: *See—*
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Rhor Industries, Inc.: *See—*
Tantlinger, Keith W., 4,031,677.

Ribich, Thomas Anthony, to Weldon Tool Company, The. Countersinking and deburring tool. 4,032,251, Cl. 408-199.000.

Rice, Dale W., to Corning Glass Works. Plural crystal pulling from a melt in an annular crucible heated on both inner and outer walls. 4,032,390, Cl. 156-608.000.

Rice, Richard C.; and Horn, Barry N., to Automated Systems, Inc. Security alarm system. 4,032,908, Cl. 340-213.00R.

Rice, Stephen E., to Digital Development Corporation. Method and system for encoding and decoding digital data. 4,032,979, Cl. 360-40.000.

Rich, Leonard G., to Gerber Scientific Instrument Company, The. Method and apparatus for examining a body by a beam of X-rays or other penetrating radiation. 4,032,784, Cl. 250-355.000.

Richardson-Merrell Inc.: *See—*
Parker, Roger Alan, 4,032,647.

Richardson, Rolland A., to Canron, Inc. Alert means for a programming system for press brakes or the like. 4,031,731, Cl. 72-37.000.

Richardson, William Henry; and Guha, Prodyot, to Langley Alloys Limited. Corrosion resistant steels. 4,032,367, Cl. 148-38.000.

Richmond, Abraham W., to Harris Corporation. Wide range power control for electric discharge lamp and press using the same. 4,032,817, Cl. 315-149.000.

Richter, Eike, to General Electric Company. Inside-out motor/alternator with high inertia smooth rotor. 4,032,807, Cl. 310-178.000.

Ricoh Co., Ltd.: *See—*
Tani, Tatsuo, formerly Nishikawa; Tatsumi, Susumu; Tanaka, Mitsuo; Ota, Sakae; and Midorikawa, Akira, 4,032,229.

Rideout, Marvin. Emergency cooling system for air-conditioned vehicles. 4,031,710, Cl. 62-171.000.

Riebel, Hans-Jochem: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Schroder, Rolf; Uhrhan, Paul; Homeyer, Bernhard; Behrenz, Wolfgang; and Hammann, Ingeborg, 4,032,634.

Riechmann, Wernfried: *See—*
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Riedle, Rudolf: *See—*
Spork, Helmut; Strasser, Rudolf; Riedle, Rudolf; Jacques, Wolfgang; and Waas, Johann, 4,032,557.

Rieger, Michael Lawrence, to Tektronix, Inc. Constant velocity vector generator. 4,032,768, Cl. 235-197.000.

Riethmuller, Lothar Herbert: *See—*
Kiefer, Hans Walter; Riethmuller, Lothar Herbert; and Spreitzhofer, Ernst Gunther Robert, 4,032,235.

Riley, David W.: *See—*
Eager, George S., Jr.; and Riley, David W., 4,032,381.

Rinio, Johannes Augustus. Cable hauling device comprising self clamping jaws. 4,032,110, Cl. 254-76.000.

Riseman, Jacob, to International Business Machines Corporation. Beam-lead integrated circuit structure and method for making the same including automatic registration of beam-leads with corresponding dielectric substrate leads. 4,032,058, Cl. 228-180.00A.

Rising, Orville C.: *See—*
Singh, Karnel; Denny, Thomas A.; Fritz, Daniel P.; and Rising, Orville C., 4,031,610.

RJR Archer, Inc.: *See—*
Dunnington, Richard Harry; Viglianco, Carl Michael; and Wilkens, George Rudolph, 4,032,684.

Robert Bosch Fernsehanlagen G.m.b.H.: *See—*
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Robert Bosch G.m.b.H.: *See—*
Banzhaf, Werner; Stumpp, Gerhard; and Schielinsky, Gerhard, 4,031,873.
Boeters, Karl-Ernst, 4,032,964.
Bosch, Paul, 4,032,260.

Roberts, David C., to International Business Machines Corporation. Pattern-recognition systems having selectively alterable reject/substitution characteristics. 4,032,887, Cl. 340-146.3ED.

Roberts, Frederick D., to FMC Corporation. Fabrication of box parts from plastic material. 4,032,280, Cl. 425-383.000.

Roberts, Gary F., to Kartridg Pak Co., The. Food product stuffing pump with vacuum line. 4,032,049, Cl. 222-238.000.

Roberts, Raymond P.; and Nilson, Sven Arthur John, Jr. Free standing redecoratable vertical wall or divider. 4,031,675, Cl. 52-36.000.

Roberts, Robert Earl: *See—*
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Robinson, David Errol: *See—*
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Robinson, John W., to Kirby Lumber Corporation. Apparatus for reducing the opacity of the emissions from wood dryers. 4,031,631, Cl. 34-235.000.

Rockwell International Corporation: *See—*
Caloyannides, Michael A., 4,032,762.
Chen, Thomas T., 4,032,905.
Henry, Rodney D., 4,032,216.
Koistinen, Clayton W., 4,032,729.
Morgan, Charles P.; and Lamy, Jean L., 4,032,094.

Roeder, George K. Valve assembly for reciprocating downhole pumps. 4,032,266, Cl. 417-571.000.

Roehrich, Christian, to Nuova San Giorgio S.p.A. Device for reinserting the broken yarn in an open end spinning unit. 4,031,691, Cl. 57-34.00R.

Rogers, Jerry W.: *See—*
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Rogers, Peter, to Possum Controls Limited. Page-turners. 4,031,644, Cl. 40-104.00A.

Rogers, William B. Hair curling apparatus. 4,031,907, Cl. 132-40.000.

Rohlig, Rainer: *See—*
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Rohm and Haas Company: *See—*
Emmons, William D., 4,032,686.

Rohr, Franz Josef; and Holick, Hubert, to Brown, Boveri & Cie. A.G. Method and apparatus for the automatic control of the air ratio of a combustion process. 4,032,285, Cl. 431-12.000.

Rokosz, Ferdinand, to Westinghouse Electric Corporation. Safety switch which renders hid lamp inoperative on accidental breakage of outer envelope. 4,032,816, Cl. 315-73.000.

Rolls-Royce (1971) Limited: *See—*
Fisher, Maurice; Kruger, Michael; and Maber, Terence Walter, 4,032,359.
Snell, Leonard Stanley, 4,032,258.

Romanoff, Paul Ira. Portable sauna. 4,031,573, Cl. 4-164.000.

Ronnmark, Per Magnus Lennart, to Molnlycke AB. Surgical suction sets. 4,031,896, Cl. 128-276.000.

Roper Corporation: *See—*
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Rosaen, Nils O. Filter device with rotatable bypass valve. 4,032,451, Cl. 210-232.000.

Rose, Lloyd E.; and Maruca, Joseph P., to Textron, Inc. Tray type card file. 4,031,645, Cl. 40-68.600.

Roselli, Sergio, to Saint-Gobain Industries. Control system for vehicle window heater. 4,032,745, Cl. 219-203.000.

Rosen, Perry: *See—*
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Ross, David S., to Sterling Drug Inc. Removal of grease and oil from particulate bed granules by backwashing with a detergent. 4,032,443, Cl. 210-82.000.

Ross, Ivan L.: *See—*
Bell, Edward L.; and Ross, Ivan L., 4,031,829.

Ross, John P.; and Bernardi, Carl E., to National Semiconductor Corporation. Apparatus for plating semiconductor chip headers. 4,032,422, Cl. 204-224.00R.

Ross, Sigmund Lance; Shuffman, Oscar, deceased; and Shuffman, Rose, executrix, to Shuffman, Rose, Executrix. Cryothermal manipulation of petroleum spills on water. 4,031,707, Cl. 61-1.00F.

Ross, Warren N., to Tomlinson, Audie B. Backhoe bucket tilt. 4,032,025, Cl. 214-138.00R.

Rossan, Kare Ragnvald; and Ekman, Gunnar Olof, to Nitro-Nobel A.B. Explosive composition with tellurite gelling agent. 4,032,376, Cl. 149-60.000.

Roth, Albert, to United States of America, Navy. Digital correlator. 4,032,885, Cl. 340-146.1AX.

Roth, Walter L.: *See—*
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Rothmans of Pall Mall Canada Limited: *See—*
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Rothrock, Larry R., to Union Carbide Corporation. Laser device for altering surfaces in accordance with given patterns. 4,032,861, Cl. 331-94.50C.

Rotier, Donald Jack; and Ferrin, Frank J., to Honeywell Inc. Ultrasonic air movement and temperature measuring apparatus. 4,031,756, Cl. 73-189.000.

Roussel-UCLAF: *See—*
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Routien, John B.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; Routien, John B.; Shibakawa, Riichiro; and Tone, Junsuke, 4,032,631.
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Routien, John B.; Jefferson, Mark T.; Shibakawa, Riichiro; and Tone, Junsuke, 4,032,632.

Rowland-Hill, Edward W., to Sperry Rand Corporation. Concave for an axial flow type combine. 4,031,901, Cl. 130-27.00T.

Rowsell, David G.; and Spring, David J., to Wilkinson Sword Limited. Cyclic sulphoxides and sulphones having a physiological cooling action on the human body. 4,032,661, Cl. 424-337.000.

RTE Corporation: *See—*
Taj, Hatim H., 4,032,205.

Ruby, Gary Victor: *See—*
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Ruenzi, Kurt. Apparatus for individually removing sheets from a stack. 4,032,135, Cl. 271-116.000.

Ruettinger, Thurman O.: *See—*
Dolan, Courtney F.; and Ruettinger, Thurman O., 4,031,780.

Ruffieux, Stanislas; and Schade, Ekkehard, to BBC Brown Boveri & Company Limited. Gas-pressurized electrical switch with current-generated magnetic field for assisting arc extinction. 4,032,736, Cl. 200-147.00R.

Ruhrchemie Aktiengesellschaft: *See—*
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Ruhrkohle AG: *See—*
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Runkel, Fritz: *See—*
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Ruppert, Jurgen: *See—*
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Russell, Herman F. Disassemblable article transport, storage and handling truck. 4,032,165, Cl. 280-79.300.

Russell, Kenneth J.: *See—*
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Russell, Shelby J.: *See—*
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Ruti Machinery Works Ltd.: *See—*
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Ruti-Te Strake B.V.: *See—*
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van Duynhoven, Adrianus Henricus, 4,031,923.

Rutkowski, John L., to Appleton Electric Company. Multiple socket assembly for electrical components. 4,032,209, Cl. 339-91.00R.

Ryckman, William D., Jr.; and Little, Lester D., to General Electric Company. Steam iron water gauge. 4,031,638, Cl. 38-77.200.

Ryder, Alan G.: *See—*
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Ryken, Marvin L., to United States of America, Navy. 1 to 18 GHz microwave signal generator. 4,032,859, Cl. 331-53.000.

Ryncosky, Robert G.; and Carroll, Alexander A., to Carrier Corporation. Compensating ring for a rotary machine. 4,032,253, Cl. 415-136.000.

Rysz, Walter Robert: *See—*
Nubani, Jawdat Ibrahim; and Rysz, Walter Robert, 4,031,597.

S. A. Bekaert-Cockerill, N.V.: *See—*
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Sadayori, Toshio: *See—*
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Sadler, Karl-Otto: *See—*
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Safety Research & Engineering Corporation: *See—*
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Saft-Societe des Accumulateurs Fixes et de Traction: *See—*
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St. Clair, David J.: *See—*
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Saint-Gobain Industries: *See—*
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Sakai, Shuzo; and Tsuyama, Naoto, to Kabushiki-Kaisha Hayashibara Seibutsukagaku Kenkyujo. Process for the production of saccharified starch products wherein maltose is the predominant constituent. 4,032,403, Cl. 195-31.00R.

Sakanoue, Seiki; Tsubota, Motohiko; Fuseya, Yoshiharu; Adachi, Keiichi; and Shishido, Tadao, to Fuji Photo Film Co., Ltd. High molecular weight mercapto compound in color diffusion transfer processing composition. 4,032,349, Cl. 96-77.000.

Sala Magnetics, Inc.: *See—*
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Salemme, Robert M., to General Electric Company. Preparation of microporous polycarbonate resin membranes. 4,032,309, Cl. 55-158.000.

Salvat Editores, S.A.: *See—*
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Sambur, Marvin Robert, to Bell Telephone Laboratories, Incorporated. Speaker recognition arrangement. 4,032,711, Cl. 179-1.50B.

Samejima, Hiroshi, to Mitsubishi Petrochemical Co., Ltd. Curable resin compositions. 4,032,593, Cl. 260-835.000.

Samhammer, Clair A.; and Sullivan, James Patrick, to Samsonite Corporation. Lockable zipper closure. 4,031,723, Cl. 70-68.000.

Samsonite Corporation: *See—*
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Sanderford, M. Vincent: *See—*
Davis, Philip J.; and Sanderford, M. Vincent, 4,032,063.

Sanders, Art. Web process control apparatus. 4,031,752, Cl. 73-159.000.

Sanders, Frederick W., to Mead Corporation, The. Method for pro-

moting reduction oxidation of electrolytically produced gas. 4,032,415, Cl. 204-78.000.
Sanders, Richard E. Game apparatus. 4,032,148, Cl. 273-120.00R.
Sandiford, Burton B.; and Knight, Robert K., to Union Oil Company of California. Plugging of water-producing zones in a subterranean formation. 4,031,958, Cl. 166-270.000.
Sandoz, Inc.: *See—*
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Hardtmann, Goetz E., 4,032,528.
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Burkhard, Hermann; Entschel, Roland; and Steinemann, Willy, 4,032,532.
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Spiegel, Rene; Gogerty, John H.; Loew, Dieter M.; and Eden, Phillip L., 4,032,637.
Sanford, Arthur Carol. Combination wood and metal truss structure. 4,031,686, Cl. 52-693.000.
Sanford, Lawrence. Method and apparatus for testing and treating well formations. 4,031,957, Cl. 166-264.000.
Sangster, Arlon G.: *See—*
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Sano, Tomoharu: *See—*
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Sanyo Electric Co., Ltd.: *See—*
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Sato, Masaaki. Adapter for use in transcribers. 4,032,983, Cl. 360-69.000.
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Sauder, Robert A.: *See—*
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Sauer, Hans, to Sauer, Hans; and Matsushita Electric Works Ltd., a part interest to each. Carrier for circuit elements having contact-making terminals. 4,032,871, Cl. 335-202.000.
Savage, John E. Means and method for generating permutations of a square. 4,032,764, Cl. 235-152.000.
Savini, Charles G., to Exxon Research and Engineering Company. Process for the manufacture of aldehydes and HDA and other alcohols by aldol condensation. 4,032,578, Cl. 260-601.00R.
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Schaming, Edward. Flatness monitoring system for strip material. 4,031,741, Cl. 73-37.700.
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Schenavar, Harold E. Road shock energy converter for charging vehicle batteries. 4,032,829, Cl. 320-61.000.
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Schulz, David Arthur, to Union Carbide Corporation. Process for

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Sheth, Rajesh N.; and Guzy, Raymond L., to Borg-Warner Corporation. Rotary vane compressor with improved vane extension means. 4,032,270, Cl. 418-266.000.
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Steffens, Charles J.; and Steffens, Scott D. Roller positioning method and apparatus for buckle-type paper folding machine. 4,032,133, Cl. 270-68.00A.

Steffens, Scott D.: *See—*
Steffens, Charles J.; and Steffens, Scott D., 4,032,133.

Stege, Peter; and Hermeyer, Bernd, to U.S. Philips Corporation. Circuit arrangement for supervising the loading of an X-ray tube. 4,032,788, Cl. 250-414.000.

Steinberg, David Herbert: *See—*
Dexter, Martin; Spivack, John D.; and Steinberg, David Herbert, 4,032,562.

Steinberg, George N.: *See—*
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Burkhard, Hermann; Entschel, Roland; and Steinemann, Willy, 4,032,532.

Stenkvist, Sven Einar, to Asea Aktiebolag. Method and apparatus for treating a metal melt. 4,032,704, Cl. 13-10.000.

Sterling Drug Inc.: *See—*
Crounse, Nathan N.; and Schmidt, Paul J., 4,032,527.
Lesher, George Y.; and Singh, Baldev, 4,032,523.
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Stevenson, Robert Andrew: *See—*
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Stewart, James P. Collar for a small animal. 4,031,859, Cl. 119-106.000.

Stielow, John R.: *See—*
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Stift, Kurt; and Vacek, Helwig, to Vereinigte Osterreichische Eisen- und Stahlwerek-Alpine Montan Aktiengesellschaft. Process for the production of iron from iron ores and apparatus for carrying out said process. 4,032,121, Cl. 266-163.000.

Stiller, Bernd: *See—*
Blum, Rudolf; and Stiller, Bernd, 4,031,995.

Stoakes, Richard Lewis. Structural assemblies. 4,031,680, Cl. 52-400.000.

Stocker, Walbert A. Tree transplanting machine. 4,031,637, Cl. 37-2.00R.

Stoddard, John W.: *See—*
Pickett, Oscar A., Jr.; and Stoddard, John W., 4,032,517.

Stora Kopparbergs Bergslags Aktiebolag: *See—*
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Story, Michael S.: *See—*
Smith, Ronald D.; Fies, William J.; Reeher, John R.; and Story, Michael S., 4,032,782.

Strasser, Rudolf: *See—*
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Strathearn Audio Limited: *See—*
Stanwell-Smith, Colin Howard; Plummer, Dexter Robert; Easthope, Frederick James; and Pope, Jonathan Humfrey, 4,032,158.

Strawson, Colin John: *See—*
Aldridge, David Cecil; Crawley, Graham Charles; and Strawson, Colin John, 4,032,651.

Strik, Francis Bernardus, to U.S. Philips Corporation. Method of manufacturing a cathode ray tube for displaying colored pictures and cathode ray tube manufactured according to said method. 4,032,342, Cl. 96-36.100.

Strobl, Fred A.; and Di Legge, Felix, to Korhumel Industries, Inc. Battery back-up system for electromagnets. 4,032,828, Cl. 320-39.000.

Stromberg Datagraphix Inc.: *See—*
Haflinger, Dan Joseph, 4,032,815.

Stryker, Lynden J.: *See—*
Ball, Frank J.; Braddon, David V.; and Stryker, Lynden J., 4,032,353.

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Stumpf, Friedrich: *See—*
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Stumpp, Gerhard: *See—*
Banzhaf, Werner; Stumpp, Gerhard; and Schielinsky, Gerhard, 4,031,873.

Subramanian, Gopal; and McAfee, John Gilmore, to Research Corporation. Bone-seeking technetium-99m complex. 4,032,625, Cl. 424-1.000.

Suchan, Joseph T.; and Burell, Vincent A., to Koh-I-Noor Rapidograph, Inc. Tooth whitening cosmetic composition. 4,032,627, Cl. 424-54.000.

Suda, Shouetu: *See—*
Oishi, Kazuaki; Nakano, Seizo; and Suda, Shouetu, 4,032,820.

Suga, Yoshiyuki; Kita, Tsutomu; and Harada, Ryusuke, to Fuji Jukogyo Kabushiki Kaisha. Port liner assembly. 4,031,699, Cl. 60-282.000.

Sugimoto, Takashi; and Wada, Yoshio, to Tokyo Shibaura Electric Co., Ltd. Automatic gain control circuit. 4,032,799, Cl. 307-264.000.

Sugiura, Yoshiaki: *See—*
Aibe, Tsuyoshi; Sugiura, Yoshiaki; and Okada, Yuzuru, 4,032,175.

Sugiyama, Masamichi; Ebina, Ryuzo; Tanaka, Minoru; Sukekawa, Ikuo; and Sawada, Susumu, to Mitsubishi Kasei Kogyo Kabushiki Kaisha. Welding apparatus. 4,032,387, Cl. 156-497.000.

Sukekawa, Ikuo: *See—*
Sugiyama, Masamichi; Ebina, Ryuzo; Tanaka, Minoru; Sukekawa, Ikuo; and Sawada, Susumu, 4,032,387.

Sullivan, Bruce M., to Donaldson Company, Inc. Pressure ratio reversal indicator. 4,031,847, Cl. 116-65.000.

Sullivan, James Patrick: *See—*
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Sullivan, Philip E. Flexible bag supporting device. 4,031,689, Cl. 53-370.000.

Sulzer Brothers Limited: *See—*
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Laubli, Fritz, 4,031,863.

Sumitomo Chemical Company, Limited: *See—*
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.
Kato, Shozo; Takahashi, Yutaka; Miyaji, Yorio; Kondo, Naomitsu; and Fukumoto, Mikio, 4,032,020.
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Sumitomo Durez Company, Ltd.: *See—*
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Sumitomo Electric Industries, Ltd.: *See—*
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Sumitomo Rubber Industry, Ltd.: *See—*
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Sumitomo, Yuji: *See—*
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Summers, William J.; and Betz, William F., to Westinghouse Electric Corporation. End-forming machine for fluorescent lamp tubes. 4,031,598, Cl. 29-25.190.

Sumner, Fred T.: *See—*
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Sundstrand Corporation: *See—*
Linscott, Phillip S., Jr., 4,032,057.

Supernaw, John W.: *See—*
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Survival Technology, Inc.: *See—*
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Kaplan, Sheldon; Calkins, George B.; Sarnoff, Stanley J.; and Dalling, N. Lawrence, 4,031,893.

Sutcliffe, Grenville G.; and Dumpis, Janis, to Husky Corporation. Automatic shut-off nozzle with lockable vapor relief valve. 4,031,930, Cl. 141-207.000.

Suzuki, Hitoshi: *See—*
Yasuda, Hiroki; Sawafuji, Shuji; and Suzuki, Hitoshi, 4,031,867.

Suzuki, Ken: *See—*
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Suzuki, Sadao, to Sony Corporation. Sensing circuits. 4,032,953, Cl. 357-25.000.

Suzuki, Shin; Uesugi, Masami; and Sekine, Michi, to Rapistan, Incorporated. Automatic sorting conveyor systems. 4,031,998, Cl. 198-365.000.

Sweeney, Doris; and Lee, Mary Ellen. Contoured travel pillow. 4,031,578, Cl. 5-337.000.

Sweet, Ralph: *See—*
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Swiss Aluminium Ltd.: *See—*
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Switzer, William K.: *See—*
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Sybron Corporation: *See—*
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Sycle, Junius, Jr., to United States of America, Navy. Retaining clip. 4,032,036, Cl. 220-324.000.

Syncal Corporation: *See—*
Raag, Valvo, 4,032,363.

Syntex (U.S.A.) Inc.: *See—*
Workman, Samuel Thomas, 4,032,789.

Syva Company: *See—*
Ullman, Edwin F., 4,032,519.

Szonntagh, Eugene L., to Honeywell Inc. Method of making a combination ion responsive and reference electrode. 4,031,606, Cl. 29-570.000.

Tabary, Jean Pierre, to Viscora. Method of assembling seamless flexible tubing and the tubular assembly of lengths of such tubing. 4,032,176, Cl. 285-18.000.

Tabrah, Joseph G.: *See—*
McElhoe, Bruce A.; and Tabrah, Joseph G., 4,031,915.
McElhoe, Bruce A.; and Tabrah, Joseph G., 4,032,072.

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Taillandier, Georges Marcel; Benoit-Guyod, Jean-Louis Alain; Boucherle, Andre Louis; Eymard, Pierre Luc; and Broll, Madeleine, to Labaz. Acetoxime derivatives and process for preparing the same. 4,032,660, Cl. 424-327.000.

Tairaka, Yoshihiko: *See—*
Keshi, Akizo; Kodama, Katsuhisa; Takemura, Ichiro; Tairaka, Yoshihiko; and Yoshinaga, Kunio, 4,032,574.

Taj, Hatim H., to RTE Corporation. Adaptor for a high voltage cable. 4,032,205, Cl. 339-13.000.

Tajima, Shigeru: *See—*
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Takahashi, Shiro, to Man Design Co., Ltd. Closed-type electromagnetic compressor. 4,032,264, Cl. 417-417.000.

Takahashi, Yasuyuki; and Sano, Tomoharu, to Kabushiki Kaisha Komatsu Seisakusho. Automatic control system controlling a ripper used on a construction equipment. 4,031,964, Cl. 172-9.000.

Takahashi, Yutaka: *See—*
Kato, Shozo; Takahashi, Yutaka; Miyaji, Yorio; Kondo, Naomitsu; and Fukumoto, Mikio, 4,032,020.

Takai, Makoto: *See—*
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Takano, Rikuo; Ohota, Yutaka; Yamamoto, Yoichi; Sumitomo, Yuji; Kobayashi, Toshio; and Aiba, Masahiko, to Nippon Telegraph and Telephone Public Corporation; and Sharp Kabushiki Kaisha. Distortion reduction in ink jet system printer. 4,032,924, Cl. 346-75.000.

Takashima, Kohki: *See—*
Chibata, Ichiro; Miyoshi, Munetsugu; Takashima, Kohki; and Moriya, Shoji, 4,032,641.

Takebayashi, Yoshiaki: *See—*
Kaneko, Shinichi, deceased; Kobayashi, Tsuyoshi; Takebayashi, Yoshiaki; Inaba, Shigeho; and Yamamoto, Hisao, 4,032,573.

Takeda Chemical Industries, Ltd.: *See—*
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Takei, Akira: *See—*
Togei, Ryoiku; Takei, Akira; and Wada, Kunihiko, 4,031,608.

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Takemura, Ichiro: *See—*
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Takeuchi, Tomio: *See—*
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Tamborski, Christ: *See—*
Psarras, Theodore; and Tamborski, Christ, 4,032,566.

Tami, Max M. Action batter up game apparatus. 4,032,145, Cl. 273-90.000.

Tamkin, Martyn Ridley: *See—*
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Tanabe Seiyaku Co., Ltd.: *See—*
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Tanaka, Mitsuo: *See—*
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Tanaka, Yoshimasa; Imai, Hirozo; Tsutsumi, Tadao; and Oda, Takeshi, to Matsushita Electric Works Ltd. Electric shaver with long hair trimmer. 4,031,617, Cl. 30-34.100.

Tanda, Toshikuni: *See—*
Irie, Toshio; Tanda, Toshikuni; Ichi, Tomoyuki; and Sadayori, Toshio, 4,032,675.

Tandrup, Leif Borge: *See—*
Nicolaisen, Holger; and Tandrup, Leif Borge, 4,032,128.

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Tani, Tatsuo, formerly Nishikawa; Tatsumi, Susumu; Tanaka, Mitsuo; Ota, Sakae; and Midorikawa, Akira, to Ricoh Co., Ltd. Construction of electrophotographic copying machines with a cleaning unit for photosensitive surface. 4,032,229, Cl. 355-15.000.

Taniguchi, Hitoshi: *See—*
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Tanimura, Tomihiro. Amusement device. 4,032,141, Cl. 273-1.00L.

Tanner, John E., Jr.: *See—*
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Tantlinger, Keith W., to Rhor Industries, Inc. Floor slab to side wall joint structure for transit vehicle. 4,031,677, Cl. 52-262.000.

Tasaka, Akira; Hosaka, Hirokazu; and Dohgane, Iwao, to Sumitomo Chemical Company, Limited. Method for separation of m- or p-cresol. 4,032,581, Cl. 260-621.00B.

Tate & Lyle Limited: *See—*
James, Kenneth, 4,032,702.

Tatkov, Viktor Arsentievich; and Letov, Nikolai Nikolaevich. Centrifugal pump. 4,032,256, Cl. 415-198.100.

Tatsumi, Chuji; Hashimoto, Yukio; Terashima, Masahiko; and Matsuo, Takahal, to Fuji Oil Company, Ltd. Method for producing cacao butter substitute. 4,032,405, Cl. 195-82.000.

Tatsumi, Susumu: *See—*
Tani, Tatsuo, formerly Nishikawa; Tatsumi, Susumu; Tanaka, Mitsuo; Ota, Sakae; and Midorikawa, Akira, 4,032,229.

Tauszig, Julio G. Mechanism for the application and removal of a stylus wire on stencil material to be engraved. 4,032,930, Cl. 346-163.000.

Tayco Developments, Inc.: *See—*
Taylor, Paul H., 4,031,978.

Taylor, Charles E.: *See—*
Esty, Janet M.; and Taylor, Charles E., 4,032,738.

Taylor, Michael P.: *See—*
Simons, F. Holmes; and Taylor, Michael P., 4,031,692.

Taylor, Paul H., to Tayco Developments, Inc. Energy absorber unit and energy management system. 4,031,978, Cl. 180-91.000.

Taylor, Robert E., to Taylor, Robert E.; and Schmidt, Aaron M. Container system for garage door opener. 4,032,009, Cl. 206-321.000.

Taywood Engineering Limited,: *See—*
Horner, Malcolm; Hodzic, Alija; and Haferkamp, Dirk, 4,032,402.

Tecnicas de Riego y Abono, S.A.: *See—*
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Tekade Felten & Guilleaume Fernmeldeanlagen GmbH: *See—*
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Tektronix, Inc.: *See—*
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Telefonaktiebolaget L M Ericsson: *See—*
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Templeton, Charles P. Sand picture frame. 4,031,643, Cl. 40-160.000.

Tennant Company: *See—*
Sommerfeld, George L., 4,032,307.

Tenneco Chemicals, Inc.: *See—*
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Tepas, Joseph J., Jr.; and Sangster, Arlon G., to Olin Corporation. Child-resistant cover for containers. 4,032,035, Cl. 220-318.000.

Terakawa, Minoru: *See—*
Yamagoshi, Tanoshi; Terakawa, Minoru; Shirahata, Aiiti; Sekiguchi, Sadao; Mishiba, Saburo; Shimamura, Takeshi; and Tajima, Shigeru, 4,032,597.

Terashima, Masahiko: *See—*
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Terayama, Fusaji; and Kozai, Tetsuo, to Morita Pump Kabushiki Kaisha. Braking device for ladder lifter. 4,031,980, Cl. 182-103.000.

Terry, Ruel C., to In Situ Technology, Inc. Method of recovering energy from subsurface petroleum reservoirs. 4,031,956, Cl. 166-261.000.

Tesa S.A.: *See—*
Lendi, Georges; Ginggen, Serge R.; and Vadi, Gildo, 4,031,632.

Testa, James V. Self sealing cap for a collapsible tube. 4,032,051, Cl. 222-492.000.

Testone, Anthony Q., to Statics Inc. Method of making static electricity suppressor with patterned coating. 4,031,599, Cl. 29-25.410.

Tewes, Heinrich: *See—*
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Texaco Development Corporation: *See—*
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Texaco Inc.: *See—*
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Paap, Hans J.; Arnold, Dan M.; Schultz, Ward E.; and Smith, Harry D., Jr., 4,032,778.
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Texas Instruments Incorporated: *See—*
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Textron, Inc.: *See—*
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Themelis, Nicholas John: *See—*
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Thermo Valve Corporation: *See—*
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Thermon Manufacturing Company: *See—*
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Theurer, Josef, to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H. Reference system for a track working machine. 4,031,625, Cl. 33-1.00Q.

Thiel, Heinz E. P. Solar heater. 4,031,881, Cl. 126-271.000.

Thomas, Christian: *See—*
Arvisenet, Jacques; Guery, Jean-Pierre; Olifant, Jacques; and Thomas, Christian, 4,032,823.

Thomas, Frank S. Magazine safety and ejector. 4,031,648, Cl. 42-70.00A.

Thomas, Herbert: *See—*
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Thomas Hill Engineering Co. (Hull) Ltd.: *See—*
Curtis, Sidney, 4,031,764.

Thomas, Lorimer Phillip; and Walker, Robert Harold, to Burlington Industries, Inc. Noise suppression apparatus and method for false-twist texturing machines. 4,031,690, Cl. 57-1.00R.

Thomas, Reta Greenough. Title protector. 4,031,647, Cl. 40-359.000.

Thomas, Richard J.: *See—*
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Thomas, Wesley L. Split bolt and block game. 4,032,155, Cl. 273-156.000.

Thome, Gene P., to Motorola, Inc. Package and method for a semiconductor radiant energy emitting device. 4,032,963, Cl. 357-72.000.

Thompson, Douglas: *See—*
Thompson, Richard D.; Thompson, Douglas; and Beeley, Micheal G., 4,032,294.

Thompson, Geary S. Keyboard for a musical instrument. 4,031,800, Cl. 84-423.000.

Thompson, Richard D.; Thompson, Douglas; and Beeley, Micheal G., to McGraw-Edison Company. Method for vapor phase treating garments. 4,032,294, Cl. 8-116.400.

Thompson, Robert G.; and Gund, Heinz K., to Briggs & Stratton Corporation. Thermostatic automatic choke control for small engines. 4,031,872, Cl. 123-119.00F.

Thompson, Tom H. Disk brake construction having stamped support. 4,031,986, Cl. 188-72.400.

Thornton-Trump, Walter E. Method for deicing aircraft. 4,032,090, Cl. 244-134.00C.

Threshold Technology, Inc.: *See—*
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Tiemann, Jerome J.: *See—*
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Tihanyi, Robert: *See—*
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van Dongen, Teunis; and Tijburg, Rudolf Paulus, 4,032,944.
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Timken Company, The: *See—*
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Ting, Wen C. Dental appliance. 4,031,908, Cl. 132-91.000.
Titze, Paul O. Fishing rod holder with automatic hook setter. 4,031,651, Cl. 43-15.000.
Todorova, Maria Ivanova: *See—*
Hadjiiliev, Ruscho Panayotov; Todorova, Maria Ivanova; Georgiev, Tzvetan Obretenov; Naydenov, Kubrat Vassilev; Jechev, Dinko Mihaylov; Staneva, Yanka Bogdanova; and Hadjiilieva, Irina Valcheva, 4,032,356.
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Fryer, Rodney Ian; and Walser, Armin, 4,032,535.
Walters, Chester H.: *See—*
Wright, David A.; and Walters, Chester H., 4,032,444.
Walters, Ronald Bernard; Hamey, Peter Michael; Hammond, John Anthony Gordon; and Lindon, Thomas Derek, to Sperry Rand Limited. Hydraulic actuator controls. 4,031,813, Cl. 91-433.000.
Walters, William D. Breathing mouthpiece for underwater use. 4,031,888, Cl. 128-145.00A.
Walton, Richard Eugene, II: *See—*
Moores, Robert Gordon, Jr.; and Walton, Richard Eugene, II, 4,031,672.
Walworth, Bryant Leonidas: *See—*
Cross, Barrington; and Walworth, Bryant Leonidas, 4,032,526.
Wankel, Felix, to Wankel GmbH. Rotary piston engine. 4,032,268, Cl. 418-91.000.
Wankel GmbH: *See—*
Wankel, Felix, 4,032,268.
Ward, Frank B., to Corning Glass Works. Reagent and method for TBG assay. 4,032,626, Cl. 424-1.000.
Warner-Lambert Company: *See—*
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Warrick Equipment Corporation: *See—*
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Warwick Electronics Inc.: *See—*
Kaplan, Howard B., 4,031,786.
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Wasserman, George J. Technique for pressurizing a sealed article. 4,031,688, Cl. 53-7.000.
Wasson, Daniel A., to Ireco Chemicals. Blasting composition containing calcium nitrate and sulfur. 4,032,375, Cl. 149-41.000.
Watanabe, Sataya, to Nippon Kogaku K.K. Pressure type lens tube for single lens reflex camera for incorporation in a follow-up type aperture-controlled camera. 4,032,942, Cl. 354-272.000.
Waterbury Lock & Specialty Company: *See—*
Bennett, Robert, 4,031,774.
Waters, Ethel M., administratrix: *See—*
Keifert, Hibbard G.; and Waters, Frank J., deceased, 4,032,243.
Waters, Frank J., deceased: *See—*
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Weakliem, Herbert Alfred: *See—*
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Webb, David John, to Elliston, Evans and Jackson Limited. Spring applied, electrically released brake with adjustable thrust element. 4,031,987, Cl. 188-75.000.
Weeks, Lloyd E., to Monsanto Company. Dopamine-β-hydroxylase determination method. 4,032,406, Cl. 195-103.50R.
Weeks, Robert W. Fishtape holder. 4,032,079, Cl. 242-85.100.
Wehinger, Egbert: *See—*
Moller, Eike; Meng, Karl; Wehinger, Egbert; and Horstmann, Harald, 4,032,646.
Weimer, Paul Kessler, to RCA Corporation. Charge injection device arrays. 4,032,903, Cl. 340-173.00R.
Weiss, Donald P., to Advertising Displays Corporation. Display easel. 4,032,014, Cl. 211-49.00R.
Weiss, Verne E.; Campbell, Glenn M.; and Wilson, Gerald L., to General Mills, Inc. Fried formed chip. 4,032,664, Cl. 426-76.000.
Weissmuller, Adam. Combined transmit and receive pneumatic carrier terminal with mechanical carrier catch. 4,032,082, Cl. 243-19.000.
Weisz, Paul B., to Mobil Oil Corporation. Shape selective naphtha processing. 4,032,431, Cl. 208-62.000.
Weldon Hydraulics, Inc.: *See—*
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Weldon Tool Company, The: *See—*
Ribich, Thomas Anthony, 4,032,251.
Welker, Helmut, to Bausch & Lomb Incorporated. High precision

incremental distance measuring system. 4,031,595, Cl. 250-237.00G.
Wells Manufacturing Corporation: *See—*
Alexander, Carl J., 4,031,622.
Wendt, Alan C., to United States Gypsum Company. Suspension system for sound absorption panels. 4,031,664, Cl. 49-409.000.
Wenger, George Michael: *See—*
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Wentland, Mark P.; and Albertson, Noel F., to Sterling Drug Inc. Aminomethanobenzazocine intermediates. 4,032,529, Cl. 260-293.540.
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, to Bayer Aktiengesellschaft. Imidazolylacetic acid amides, their production, antimycotic compositions comprising said compounds and their use as antimycotic agents. 4,032,636, Cl. 424-246.000.
Werner, Frank D. Timed ventilator for toilets. 4,031,574, Cl. 4-213.000.
West, Arthur C., III, to Minnesota Mining and Manufacturing Company. Fluid resistant terpolymer compositions. 4,032,699, Cl. 526-18.000.
West, Curtis C., to Wheelabrator-Frye, Inc. Rotary door blast chamber. 4,031,666, Cl. 51-419.000.
Western Electric Company, Inc.: *See—*
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Wheeler, Charles J. Squeeze actuated wrench. 4,031,785, Cl. 81-57.390.
Whigham, Biddle A., to Fluorocarbon Company, The. Attachment means for a machinery drum cover. 4,031,600, Cl. 29-118.000.
White, John F.; and Bertrand, Jerome C., to Emery Industries, Inc. Process for the production of esters. 4,032,550, Cl. 260-410.600.
White, John T.; and Lovelady, Kenneth T., to Recognition Equipment Incorporated. Wideband ink jet modulator. 4,032,928, Cl. 346-140.00R.
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Wilke, Gunther; and Heimbach, Paul, to Studiengesellschaft Kohle m.b.H. 1-Ethyl-cyclooctadiene-1,5. 4,032,585, Cl. 260-666.00A.
Wilkens, George Rudolph: *See—*
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Wilkes, Thomas Jewel, to Teledyne, Inc. Solenoid mounting assembly for musical keyboard. 4,031,796, Cl. 84-20.000.
Wilkinson Sword Limited: *See—*
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Rowsell, David G.; and Spring, David J., 4,032,661.
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Williams, Geoffrey C., to Rank Xerox Ltd. Copying machines. 4,032,225, Cl. 355-3.0DD.
Williams, Malcolm: *See—*
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Williams, Robert J.: *See—*
Mueller, Alvin W.; Williams, Robert J.; and Ansel, Robert E., 4,032,143.
Williams, Robert Russell, to International Business Machines Corporation. Logic array with enhanced flexibility. 4,032,894, Cl. 340-166.00R.
Willis, Chester R.: *See—*
Chakrin, Lawrence W.; Snader, Kenneth M.; and Willis, Chester R., 4,032,652.
Willis, David Barry, to Arrow Development Co., Inc. Adjustable position counterweight assembly for amusement ride. 4,032,138, Cl. 272-33.00R.
Willis, Wilburn Coy, to Aluminum Company of America. Pressure release device for a container. 4,032,034, Cl. 220-266.000.
Wilson, Calvin L., to Reynolds Metals Company. Liquid dispensing container construction. 4,032,047, Cl. 222-183.000.
Wilson, Clyde E.; and Nicoson, Robert D., to Wilson-Tek Corporation. Apparatus for forming bells on plastic tubes. 4,032,282, Cl. 425-393.000.
Wilson, David C. Paddle and puck game equipment. 4,032,150, Cl. 273-126.00R.
Wilson, David S.: *See—*
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Wilson, Roy P. Printing press. 4,031,822, Cl. 101-53.000.
Wilson-Tek Corporation: *See—*
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Wong, Kwan Y., to International Business Machines Corporation. Pseudo halftone print generator and method. 4,032,978, Cl. 358-283.000.
Wood, David E., to General Electric Company. Intensity modulated display system. 4,032,912, Cl. 340-324.00A.
Wood, Donald W., to Argus Chemical Corporation. Alpha-halo substituted diacyl peroxides. 4,032,605, Cl. 260-610.00D.
Wood, Leonard A. Kit of parts for a welded trailer hitch. 4,032,170, Cl. 280-495.000.
Wood, Theodore W. Hockey mask. 4,031,564, Cl. 2-9.000.
Wooding Corporation: *See—*
Wooding, Patrick J., 4,032,705.
Wooding, Patrick J., to Wooding Corporation. Consumable electrode furnace crucibles. 4,032,705, Cl. 13-32.000.
Woodruff, Henry C., to Gramor Machine Company. Agricultural equipment clamp. 4,032,245, Cl. 403-385.000.
Workman, Samuel Thomas, to Syntex (U.S.A.) Inc. Means for controlling operation of power sources associated with an axial tomographic system. 4,032,789, Cl. 250-445.00T.
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Wray, William R., to Polaroid Corporation. Sound recording and reproducing system for sound motion picture photography. 4,032,224, Cl. 352-11.000.
Wright, David A.; and Walters, Chester H., to National Marine Service, Inc. Gravitational separator for mixtures of immiscible liquids of different densities. 4,032,444, Cl. 210-86.000.
Wright, Herschel Eugene, to Beckman Instruments, Inc. Adapters for centrifuge rotors. 4,032,066, Cl. 233-26.000.
Wright, Joseph H., to Polaroid Corporation. Film unit light shielding adapter for photographic apparatus. 4,032,937, Cl. 354-86.000.

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Yagi, Hajime; and Tsuyuki, Tadaharu, to Sony Corporation. Semiconductor device. 4,032,957, Cl. 357-37.000.
Yagi, Hajime; and Tsuyuki, Tadaharu, to Sony Corporation. Semiconductor device. 4,032,958, Cl. 357-37.000.
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Yamagoshi, Tanoshi; Terakawa, Minoru; Shirahata, Aiiti; Sekiguchi, Sadao; Mishiba, Saburo; Shimamura, Takeshi; and Tajima, Shigeru, to Sumitomo Chemical Company, Limited. Thermoplastic resin composition. 4,032,597, Cl. 260-876.00R.
Yamamoto, Hisao: *See—*
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Yamashiro, Osamu; and Hatsukano, Yoshikazu, to Hitachi, Ltd. Electronic circuit having a misfet as an amplifying element. 4,032,864, Cl. 331-116.00R.
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Yant, Howard W.: *See—*
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Yarwood, John C.; Dore, James E.; and Preuss, Robert K., to Swiss Aluminium Ltd. Apparatus and method for in-line degassing and filtration of molten metal. 4,032,124, Cl. 266-218.000.
Yasuda, Hiroki; Sawafuji, Shuji; and Suzuki, Hitoshi, to Fuji Jukogyo Kabushiki Kaisha. Internal combustion engine combustion process. 4,031,867, Cl. 123-32.0ST.
Yasuda, Hirotsugu, to United States of America, Interior. Semipermeable membrane. 4,032,440, Cl. 210-23.00H.
Yokota, Yukio: *See—*
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Youmans, Arthur H.; and Lichtenberg, Heinz D., to Dresser Industries, Inc. Apparatus for logging inclined earth boreholes. 4,031,750, Cl. 73-151.000.
Young, Danny J., to Fair, James W., a part interest. Remote alarm monitoring and circuit control system. 4,032,907, Cl. 340-213.00R.
Young, Reginald S.: *See—*
Lawson, Robert; and Young, Reginald S., 4,032,308.
Young, Robert A., to Xonics, Inc. Method of using resonance atomic scattering of radiation to measure gaseous species. 4,032,786, Cl. 250-373.000.
Young, Ronald: *See—*
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Young, Warren C.: *See—*
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Youtsey, Karl J.; and Sarazin, Richard G., to Universal Oil Products Company. Radiant heating panel. 4,032,751, Cl. 219-538.000.
Yukumoto, Toshitaka: *See—*
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Zabcik, Clarence John. Automatic sequential dual action sealing system. 4,031,716, Cl. 64-23.000.
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Zapf, Gerhard; Albano-Muller, Lothar; Kiethe, Horst; and Rohlig, Rainer, to Sintermetallwerk Krebsoege GmbH. Process for making metallic, molded composite bodies. 4,032,335, Cl. 75-208.00R.
Zedron, Inc.: *See—*
Georgia, Edward J.; Eggers, Russell K. H.; and Molnar, Ernest L., 4,031,937.
Zehnder, Gottlieb, to BBC Brown Boveri & Company Limited. Housing arrangement for a two-stage exhaust-gas turbocharger. 4,032,262, Cl. 417-409.000.
Zeman, Wayne P.: *See—*
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Zenith Radio Corporation: *See—*
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Schwartz, James W.; Gioia, Norman F.; and Gautier, Franklyn P., 4,032,811.
Zhuk, David Solomonovich; Gembitsky, Petr Alexandrovich; and Chmarin, Anatoly Ivanovich. Method of producing linear polyethylenimine. 4,032,480, Cl. 260-2.0EN.
Ziegler, Gunther; and Frohmader, Sigrun, to Siemens Aktiengesellschaft. Method for the manufacture of a superconductor with a superconductive intermetallic compound consisting of at least two elements. 4,031,609, Cl. 29-599.000.
Ziegler, Joseph, to Pennsylvania Engineering Corporation. Lance seal for converter vessel gas collecting hood. 4,032,119, Cl. 266-158.000.
Zies, Ray Keith: *See—*
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Zilch, Horst E.; and Fischer, Paul W., to Union Oil Company of California. Inhibition of scale deposition in high temperature wells. 4,032,460, Cl. 252-8.55B.
Zinniger, Theodore C.; and Burke, Phillip J., to Kaiser Aluminum & Chemical Corporation. Cryogenic liquid containment method. 4,032,608, Cl. 264-46.600.
Zitting, Gordon T., to Poly Seal, Inc. Interference compression seal. 4,032,159, Cl. 277-145.000.
Zoecon Corporation: *See—*
Henrick, Clive A.; and Staal, Gerardus B., 4,032,564.
Zogg, Andreas: *See—*
Marti, Heinrich; Zogg, Andreas; and Hardegger, Oskar, 4,031,946.
Zollinger, Hans; and Honegger, Rolf, to Ruti Machinery Works Ltd. Loom with means for introducing the filling threads by means of a fluid. 4,031,926, Cl. 139-435.000.
Zucker, Edwin, to Xerox Corporation. Multiple range variable magnification reproduction machine using three-dimensional cam. 4,032,231, Cl. 355-60.000.
Zwettler, Ernest, to Pennwalt Corporation. Dental x-ray film processing system. 4,032,943, Cl. 354-312.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF JUNE, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bausch & Lomb Incorporated: *See—*
Burns, Richard H.; and Welker, Helmut, Re. 29,281.
Burns, Richard H.; Hosack, Donald R.; and Welker, Helmut, Re. 29,282.

Burns, Richard H.; and Welker, Helmut, to Bausch & Lomb Incorporated. Measuring apparatus using the moire fringe concept of measurement. Re. 29,281, Cl. 356-169.000.

Burns, Richard H.; Hosack, Donald R.; and Welker, Helmut, to Bausch & Lomb Incorporated. Measuring apparatus using the moire fringe concept of measurement. Re. 29,282, Cl. 356-169.000.

Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, to Du Pont de Nemours, E. I., and Company. Method for concomitant particulate diamond deposition in electroless plating, and the product thereof. Re. 29,285, Cl. 428-426.000.

Dunham-Bush, Inc.: *See—*
Shaw, David N., Re. 29,283.

Du Pont de Nemours, E. I., and Company: *See—*
Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, Re. 29,285.

Eustice, Albert Lawrence: *See—*
Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, Re. 29,285.

Fretwell, Jack W., Jr. Device for launching and dousing light sails such as spinnakers. Re. 29,279, Cl. 114-104.000.

Fukaya, Hirokazu; and Higashiyama, Naotoshi, to Nippon Electric Company, Limited. Power amplifier with a bootstrapped driver stage. Re. 29,286, Cl. 330-26.000.

Graham, Arthur Hughes: *See—*
Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, Re. 29,285.

Harrington, Richard P.; and Harrington, Russell J. Combination lock. Re. 29,277, Cl. 70-25.000.

Harrington, Russell J.: *See—*
Harrington, Richard P.; and Harrington, Russell J., Re. 29,277.

Higashiyama, Naotoshi: *See—*
Fukaya, Hirokazu; and Higashiyama, Naotoshi, Re. 29,286.

Hosack, Donald R.: *See—*
Burns, Richard H.; Hosack, Donald R.; and Welker, Helmut, Re. 29,282.

McNabney, John C., to Trane Company, The. Air distribution regulator apparatus. Re. 29,280, Cl. 137-625.370.

Nippon Electric Company, Limited: *See—*
Fukaya, Hirokazu; and Higashiyama, Naotoshi, Re. 29,286.

Quintana, Leo J.: *See—*
Shaheen, Joseph M.; and Quintana, Leo J., Re. 29,284.

Rockwell International Corporation: *See—*
Shaheen, Joseph M.; and Quintana, Leo J., Re. 29,284.

Sargent Industries, Inc.: *See—*
Vogel, Rudi Richard, Re. 29,278.

Shaheen, Joseph M.; and Quintana, Leo J., to Rockwell International Corporation. Process for forming interconnections in a multilayer circuit board. Re. 29,284, Cl. 204-15.000.

Shaw, David N., to Dunham-Bush, Inc. Undercompression and overcompression free helical screw rotary compressor. Re. 29,283, Cl. 417-282.000.

Trane Company, The: *See—*
McNabney, John C., Re. 29,280.

Vogel, Rudi Richard, to Sargent Industries, Inc. Waste compacting apparatus. Re. 29,278, Cl. 100-52.000.

Welker, Helmut: *See—*
Burns, Richard H.; and Welker, Helmut, Re. 29,281.
Burns, Richard H.; Hosack, Donald R.; and Welker, Helmut, Re. 29,282.

LIST OF PLANT PATENTEES

Irwin, Lawrence T. Kalanchoe plant. 4,065, 6-28-77, Cl. 68.000.

Irwin, Lawrence T. Kalanchoe plant. 4,066, 6-28-77, Cl. 68.000.

Irwin, Lawrence T. Kalanchoe plant. 4,067, 6-28-77, Cl. 68.000.

Irwin, Lawrence T. Kalanchoe plant. 4,068, 6-28-77, Cl. 68.000.

LIST OF DESIGN PATENTEES

American Jet Industries: *See—*
Paulson, Allen E., 244,843.

Astley, John C. Animal tether. 244,870, 6-28-77, Cl. D30-44.000.

Atlas-Graham Industries Company Ltd.: *See—*
Graham, Joseph A.; Stephenson, Reginal M.; and Dewar, Donald D., 244,809.

Baca, Joseph B. Lamp. 244,875, 6-28-77, Cl. D48-20.00R.

Bachman, William John: *See—*
DiMeo, Franklin Roosevelt; and Bachman, William John, 244,866.

Bardoni, Thomas J.; and Markarian, William. Underwater belt and hose clip. 244,807, 6-28-77, Cl. D2-400.000.

Belaco International Ltd.: *See—*
Nevai, Bela B., 244,827.

Berkowitz, Florence. Combined hair roller and ornament. 244,881, 6-28-77, Cl. D28-37.000.

Bluestein, Bernard B., to Sunbeam Corporation. Coffeemaker water dispenser. 244,824, 6-28-77, Cl. D7-85.000.

Bolender, Raymond L., to Leland Engineering, Inc. Combined door and frame. 244,858, 6-28-77, Cl. D25-48.000.

Brand, Bridget A. Electronic sound producer for inducing sleep or the like. 244,878, 6-28-77, Cl. D24-99.000.

Branscum, Tony E.: *See—*
Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., 244,822.

Brooks, Donald Leslie William, to Ronson Corporation. Living hinge battery cover for electronic device. 244,864, 6-28-77, Cl. D13-10.000.

Buhk, Randall P., to Steelcase, Inc. Chair. 244,812, 6-28-77, Cl. D6-56.000.

Buhk, Randall P., to Steelcase, Inc. Chair. 244,813, 6-28-77, Cl. D6-56.000.

Burke, Frederick A.: *See—*
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Burley, William A.: *See—*
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Buss, Kenton A.: *See—*
Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., 244,822.

Carter, Howard Bryan, to Rosedale Plastics (Containers) Limited. Barrel. 244,832, 6-28-77, Cl. D9-170.000.

Champion International Corporation: *See—*
Hanson, Wallace E., 244,834.

Christen Incorporated: *See—*
Christen, Louis J., Jr., 244,819.

Christen, Louis J., Jr., to Christen Incorporated. Greenhouse potting bench. 244,819, 6-28-77, Cl. D6-179.000.

Clairol Incorporated: *See—*
Long, Douglas A.; and Burke, Frederick A., 244,882.

Classic Boats Inc.: *See—*
Granata, Peter C., Jr., 244,842.

Cordell, Carl R., Jr. Compartmented storage box primarily for fishing lures. 244,853, 6-28-77, Cl. D22-14.000.

D'Amato, Michael John, to Harvey Hubbell, Incorporated. Housing for an electrical plug. 244,861, 6-28-77, Cl. D13-24.000.

Dewar, Donald D.: *See—*
Graham, Joseph A.; Stephenson, Reginal M.; and Dewar, Donald D., 244,809.

DiMeo, Franklin Roosevelt; and Bachman, William John, to RCA Corporation. Insulator for an antenna. 244,866, 6-28-77, Cl. D14-90.000.

Doman, Donald W., to Kohler Co. Bath tub. 244,855, 6-28-77, Cl. D23-55.000.

Dotson, Frances E. Carryall bag. 244,884, 6-28-77, Cl. D87-3.00C.

Duni-Bila AB: *See—*
Persson, Karl Rune, 244,833.

E.T.E. - Electronic Telephone Equipment, S.r.l.: *See—*
Todeschini, Sergio, 244,848.
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Fieni, Walter, to Societe Anonyme Francaise du Ferodo. Memo paper holder. 244,852, 6-28-77, Cl. D19-92.000.

Freeman, Leroy C. Combined TV, stereo and accessory cabinet. 244,820, 6-28-77, Cl. D6-186.000.

General Electric Company: *See—*
Grieb, Joan, 244,831.

GKN Kent Alloys Limited: *See—*
Woodward, Richard W., 244,845.
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Gott Mfg. Co., Inc.: *See—*
Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., 244,822.

Graham, Joseph A.; Stephenson, Reginal M.; and Dewar, Donald D., to Atlas-Graham Industries Company Ltd. Brush. 244,809, 6-28-77, Cl. D4-31.000.

Granata, Peter C., Jr., to Classic Boats Inc. Boat deck or the like. 244,842, 6-28-77, Cl. D12-70.000.

Grieb, Joan, to General Electric Company. Wall plate. 244,831, 6-28-77, Cl. D8-350.000.

GSE, Inc.: *See—*
Lehoczky, Kenneth A.; and Rigdon, Thomas C., 244,829.

Guth, Gordon: *See—*
Haufe, David K.; and Guth, Gordon, 244,856.

Halapin, Robert W.; and Burley, William A. Elevated path-way educational game device. 244,873, 6-28-77, Cl. D34-5.0SS.

Hansen, Richard Ellwood: *See—*
Smith, David Rolfe; and Hansen, Richard Ellwood, 244,863.

Hanson, Wallace E., to Champion International Corporation. Carton blank. 244,834, 6-28-77, Cl. D9-245.000.

Harvey Hubbell, Incorporated: *See—*
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Jaconette, Frank Carmine, 244,860.

Hattori, Yasuo; Sakurada, Masahiko; and Miyaji, Kazumi, to Olympus Optical Co., Ltd. Micro-cassette adapter. 244,868, 6-28-77, Cl. D14-10.000.

Haufe, David K.; and Guth, Gordon, to Sunbeam Corporation. Housing for air circulating and treating appliance. 244,856, 6-28-77, Cl. D23-141.000.

Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., to Gott Mfg. Co., Inc. Insulated food chest. 244,822, 6-28-77, Cl. D7-77.000.

Hayes, Roger. Sphygmomanometer stand. 244,857, 6-28-77, Cl. D24-21.000.

Hewlett-Packard Company: *See—*
Mathis, Barry R., 244,862.

Huntington, Robert R.; and Schaefer, Henry A. Housing for a radio receiver. 244,867, 6-28-77, Cl. D14-68.000.

International Business Machines Corporation: *See—*
Kneale, Collan B.; and Wilkey, Frank, Jr., 244,865.

International Silver Company: *See—*
King, Robert J., 244,825.
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Ivac Corporation: *See—*
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Jaconette, Frank Carmine, to Harvey Hubbell, Incorporated. Housing for an electrical plug. 244,859, 6-28-77, Cl. D13-24.000.

Jaconette, Frank Carmine, to Harvey Hubbell, Incorporated. Housing for an electrical plug. 244,860, 6-28-77, Cl. D26-1.00A.

Johnson, Darlene: *See—*
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Jurgensen, Horst: *See—*
Thingstad, Hans Kristian; and Jurgensen, Horst, 244,837.

King, Robert J., to International Silver Company. Article of flatware. 244,825, 6-28-77, Cl. D7-137.000.

King, Robert J., to International Silver Company. Article of flatware. 244,826, 6-28-77, Cl. D7-137.000.

Kneale, Collan B.; and Wilkey, Frank, Jr., to International Business Machines Corporation. Magnetic tape cartridge transport. 244,865, 6-28-77, Cl. D14-6.000.

Kohler Co.: *See—*
Doman, Donald W., 244,855.

Lass, Abram L. Ice bucket. 244,823, 6-28-77, Cl. D7-78.000.

LeBreux, Frank L. Combined planter and light fixture to be used in fireplaces or the like. 244,838, 6-28-77, Cl. D11-144.000.

Lehoczky, Kenneth A.; and Rigdon, Thomas C., to GSE, Inc. Electronic torque wrench. 244,829, 6-28-77, Cl. D8-24.000.

Leland Engineering, Inc.: *See—*
Bolender, Raymond L., 244,858.

Lewis, Kenneth D.: *See—*
Havely, John E.; Buss, Kenton A.; Branscum, Tony E.; and Lewis, Kenneth D., 244,822.

Libella Tool AB: *See—*
Thingstad, Hans Kristian; and Jurgensen, Horst, 244,837.

Lighting Systems, Inc.: *See—*
Zelina, Thomas, 244,876.

Lombardi, David E. Attachable putting guide for golf putters. 244,874, 6-28-77, Cl. D34-5.0CB.

Long, Douglas A.; and Burke, Frederick A., to Clairol Incorporated. Dryer attachments. 244,882, 6-28-77, Cl. D28-18.000.

Malkin, Robert S. Plant balling device. 244,839, 6-28-77, Cl. D11-148.000.

Manley, Paul; and Johnson, Darlene. Animal leash. 244,869, 6-28-77, Cl. D30-39.000.

Manno, Joseph J., to Ivac Corporation. Sphygmomanometer sensor and cuff coupling mechanism. 244,879, 6-28-77, Cl. D24-29.000.

Markarian, William: *See—*
Bardoni, Thomas J.; and Markarian, William, 244,807.

Masuyama, Kazuo, to Sunpack Corporation. Photographic camera. 244,851, 6-28-77, Cl. D16-6.000.

Mathis, Barry R., to Hewlett-Packard Company. Casing for an electronic calculator. 244,862, 6-28-77, Cl. D64-11.00B.

McLaughlin, John J. Wall mounted radio, tape player, clock and dual speaker unit. 244,877, 6-28-77, Cl. D14-73.000.

Miyaji, Kazumi: *See—*
Hattori, Yasuo; Sakurada, Masahiko; and Miyaji, Kazumi, 244,868.

Nescher, Bruce E. Tunnel hull power boat. 244,841, 6-28-77, Cl. D12-62.000.

Nevai, Bela B., to Belaco International Ltd. Cleaning and draining device. 244,827, 6-28-77, Cl. D7-188.000.

Olympus Optical Co., Ltd.: *See—*
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Overman AB: *See—*
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Pace Collection, Inc., The: *See—*
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Schweitzer, Janet, 244,818.

Patterson, Chad W. Jewelry caddy. 244,810, 6-28-77, Cl. D6-28.000.

Paulson, Allen E., to American Jet Industries. Airplane. 244,843, 6-28-77, Cl. D12-71.000.

Persson, Karl Rune, to Duni-Bila AB. Folding carton. 244,833, 6-28-77, Cl. D9-235.000.

Pierce, Charles William. Holder for cylindrical container. 244,816, 6-28-77, Cl. D6-114.000.

Pierson, Max D. Coin purse. 244,885, 6-28-77, Cl. D87-3.00B.

Pomerantz, Julie. Coaster. 244,821, 6-28-77, Cl. D7-45.000.

Pryor, Barbara. Shoe puller. 244,806, 6-28-77, Cl. D2-378.200.

RCA Corporation: *See—*
DiMeo, Franklin Roosevelt; and Bachman, William John, 244,866.

Reynolds Metals Company: *See—*
Wilson, Calvin L., 244,850.

Rigdon, Thomas C.: *See—*
Lehoczky, Kenneth A.; and Rigdon, Thomas C., 244,829.

Risdon Manufacturing Company, The: *See—*
Ubermuth, Ernest F., 244,808.

Rohrmuller, August. Purse hanger or similar article. 244,883, 6-28-77, Cl. D87-2.00R.

Ronson Corporation: *See—*
Brooks, Donald Leslie William, 244,864.

Rosedale Plastics (Containers) Limited: *See—*
Carter, Howard Bryan, 244,832.

Sakurada, Masahiko: *See—*
Hattori, Yasuo; Sakurada, Masahiko; and Miyaji, Kazumi, 244,868.

Salamone, Dante A. Catch basin grate. 244,854, 6-28-77, Cl. D23-42.000.

Schaefer, Henry A.: *See—*
Huntington, Robert R.; and Schaefer, Henry A., 244,867.

Schoblom, Svante, to Overman AB. Seat. 244,814, 6-28-77, Cl. D6-71.000.

Schweitzer, Janet, to Pace Collection, Inc., The. Shelf for a wall system. 244,817, 6-28-77, Cl. D6-132.000.

Schweitzer, Janet, to Pace Collection, Inc., The. Shelf for a wall system. 244,818, 6-28-77, Cl. D6-132.000.

Sheth, Harshadrai D. Electronic hour glass clock. 244,835, 6-28-77, Cl. D10-15.000.

Smith, David Rolfe; and Hansen, Richard Ellwood, to Tektronix, Inc. Keyboard module. 244,863, 6-28-77, Cl. D14-45.000.

Snow, Bill D. Cot. 244,815, 6-28-77, Cl. D6-79.000.

Societe Anonyme Francaise du Ferodo: *See—*
Fieni, Walter, 244,852.

Staley, Charles Wesley. Football hoop target or the like. 244,872, 6-28-77, Cl. D34-5.0PP.

Steelcase, Inc.: *See—*
Buhk, Randall P., 244,812.
Buhk, Randall P., 244,813.

Stephenson, Reginal M.: *See—*
Graham, Joseph A.; Stephenson, Reginal M.; and Dewar, Donald D., 244,809.

Sternfield, Jonathan Samuel. Chair. 244,811, 6-28-77, Cl. D6-56.000.

Stockton, Bruce H. Sine wave template. 244,836, 6-28-77, Cl. D10-64.000.

Stokes, Wilton. Boat. 244,840, 6-28-77, Cl. D12-62.000.

Sunbeam Corporation: *See—*
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Haufe, David K.; and Guth, Gordon, 244,856.

Sunpack Corporation: *See—*
Masuyama, Kazuo, 244,851.

Tektronix, Inc.: *See—*
Smith, David Rolfe; and Hansen, Richard Ellwood, 244,863.

Terry, Barbara J. Spray mask. 244,880, 6-28-77, Cl. D29-8.000.

Thingstad, Hans Kristian; and Jurgensen, Horst, to Libella Tool AB. Level. 244,837, 6-28-77, Cl. D10-69.000.

Todeschini, Sergio, to E.T.E. - Electronic Telephone Equipment, S.r.l. Telephone set, or similar article. 244,848, 6-28-77, Cl. D14-56.000.

Todeschini, Sergio, to E.T.E. - Electronic Telephone Equipment, S.r.l. Telephone set, or similar article. 244,849, 6-28-77, Cl. D14-56.000.

Tulak, Richard F. Stop for windows, doors and the like. 244,830, 6-28-77, Cl. D8-402.000.

Ubermuth, Ernest F., to Risdon Manufacturing Company, The. Plastic spool for thread or the like. 244,808, 6-28-77, Cl. D3-19.00A.

Vetter, Craig W., to Vetter Design Works, Inc. Motorcycle sidecar coach. 244,844, 6-28-77, Cl. D12-116.000.

Vetter Design Works, Inc.: *See—*
Vetter, Craig W., 244,844.

Vincenti, Aldo A. Massager-exerciser for neck and back. 244,871, 6-28-77, Cl. D24-36.000.

Visco, Luigi P. Blade assembly for cutting shears. 244,828, 6-28-77, Cl. D8-5.000.

Wilkey, Frank, Jr.: *See—*
Kneale, Collan B.; and Wilkey, Frank, Jr., 244,865.

Wilson, Calvin L., to Reynolds Metals Company. Beverage dispensing container or similar article. 244,850, 6-28-77, Cl. D15-112.000.

Woodward, Richard W., to GKN Kent Alloys Limited. Vehicle wheel. 244,845, 6-28-77, Cl. D12-211.000.

Woodward, Richard W., to GKN Kent Alloys Limited. Vehicle wheel. 244,846, 6-28-77, Cl. D12-211.000.

Woodward, Richard W., to GKN Kent Alloys Limited. Vehicle wheel. 244,847, 6-28-77, Cl. D12-211.000.

Zelina, Thomas, to Lighting Systems, Inc. Combined portable fluorescent and incandescent light. 244,876, 6-28-77, Cl. D48-24.00R.

CLASSIFICATION OF PATENTS

ISSUED JUNE 28, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

9	4,031,564
78 R	4,031,565
104	4,031,566
204	4,031,567
406	4,031,568

CLASS 3

1	4,031,569
1.912	4,031,570
1.913	4,031,571

CLASS 4

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164	4,031,573
213	4,031,574
239	4,031,575
251	4,031,576

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337	4,031,578
355	4,031,579

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129	4,032,293

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171	4,031,588
248 R	4,031,589

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260	4,032,298
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20 EE	4,031,594

CLASS 26

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25.41	4,031,599
118	4,031,600
156.8 B	4,031,601
157.3 AH	4,031,602
427	4,031,603
429	4,031,604
460	4,031,605
570	4,031,606
577	4,031,607
578	4,031,608
598	4,031,610
599	4,031,609
611	4,031,611
625	4,031,612
628	4,031,613
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630 R	4,031,615

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180	4,031,619
262	4,031,621
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392	4,031,622

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62	4,031,624

CLASS 33

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178 R	4,031,632
201	4,031,628
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290	4,031,629
356	4,031,630

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CLASS 35

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143	4,031,639

CLASS 40

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104 A	4,031,644
111	4,031,642
160	4,031,643
359	4,031,646
	4,031,647

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CLASS 43

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15	4,031,651
43.12	4,031,652
61	4,031,653
114	4,031,654

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	4,032,304

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53	4,031,656
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191	4,031,658
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204	4,031,659
228	4,031,660
249	4,031,661
257	4,031,662

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501	4,031,665

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105 R	4,031,667
137	4,031,668
142	4,031,669
250	4,031,670
263	4,031,671
288	4,031,672
385	4,031,673
419	4,031,666

CLASS 52

2	4,031,674
36	4,031,675
102	4,031,676
262	4,031,677
285	4,031,678
294	4,031,679
400	4,031,680
408	4,031,681
434	4,031,682
536	4,031,683
612	4,031,684
653	4,031,685
693	4,031,686
742	4,031,687

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7	4,031,688
370	4,031,689

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	4,032,308
158	4,032,309
276	4,032,310
385 C	4,032,311

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237	4,031,695
295	4,031,696

CLASS 57

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34 R	4,031,691
140 R	4,031,692

CLASS 58

33	4,031,693

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39.55	4,031,697
251	4,031,698
282	4,031,699
322	4,031,700
325	4,031,701
	4,031,704
398	4,031,702
519	4,031,703
615	4,031,705
644	4,031,706

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58	4,031,720
	4,031,721
63	4,031,722
68	4,031,723
	4,031,724
107	4,031,725
226	4,031,726
232	4,031,727
252	4,031,728
380	4,031,729
419	4,031,730

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9	4,032,318
34	4,032,319
90	4,032,320
	4,032,321
	4,032,322
	4,032,323
93	4,032,324
95	4,032,325
96	4,032,326

CLASS 72

37	4,031,731
60	4,031,732
166	4,031,733
367	4,031,745
368	4,031,734
394	4,031,735
422	4,031,736
456	4,031,737
478	4,031,738

CLASS 73

5	4,031,739
15 B	4,031,740
37.7	4,031,741
40.7	4,031,742
67.2	4,031,744
67.8 R	4,031,743
95	4,031,746
116	4,031,747
147	4,031,748
	4,031,749
151	4,031,750
155	4,031,751
159	4,031,752
170 R	4,031,753
188	4,031,754
189	4,031,755
	4,031,756
194 VS	4,031,757
205 D	4,031,758
432 R	4,031,759
460	4,031,760

CLASS 74

15.63	4,031,761
	4,031,762
50	4,031,763
57	4,031,764
	4,031,765
231 J	4,031,766
	4,031,767
233	4,031,768
243 DR	4,031,769
462	4,031,770
479	4,031,771
501 M	4,031,772
501.5 R	4,031,773
547	4,031,774
551.9	4,031,775
567	4,031,776
569	4,031,777
571 L	4,031,778
650	4,031,779
711	4,031,780
804	4,031,781
866	4,031,782

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72	4,032,327
84.1 R	4,032,328
84.5	4,032,329
101 R	4,032,330
108	4,032,331
	4,032,332
124	4,032,333
128 C	4,032,334
208 R	4,032,335
224	4,032,336
226	4,032,337
240	4,032,302

CLASS 81

9.22	4,031,783
57.39	4,031,784
	4,031,785

CLASS 83

140	4,031,787
380	4,031,788
404.2	4,031,789
425.4	4,031,790
508.2	4,031,791
601	4,031,792
788	4,031,793
829	4,031,794

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1.03	4,031,786
1.25	4,031,795
20	4,031,796
291	4,031,798
307	4,031,799
423	4,031,800
465	4,031,801
470	4,031,797

CLASS 85

11	4,031,802
13	4,031,803

CLASS 86

23	4,031,804

CLASS 89

1.5 G	4,031,805
1.811	4,031,806
36 K	4,031,807
163	4,031,808

CLASS 90

11 A	4,031,810
11 C	4,031,809

CLASS 91

39	4,031,811
224	4,031,812
433	4,031,813

CLASS 92

63	4,031,814

CLASS 93

33 H	4,031,815
36 A	4,031,816
44.1 R	4,031,817
63 R	4,031,818

CLASS 96

1.5	4,032,338
	4,032,339
27 E	4,032,341
27 H	4,032,340
36.1	4,032,342
38.3	4,032,343
48 HD	4,032,344
55	4,032,345
56.5	4,032,346
	4,032,347
60 R	4,032,348
77	4,032,349

CLASS 98

115 R	4,031,819

CLASS 99

336	4,031,820
643	4,031,821

CLASS 100

52	Re.29,278

CLASS 101

53	4,031,822
120	4,031,823
126	4,031,824
	4,031,825

CLASS 102

20	4,031,826
70.2 G	4,031,827
89 R	4,031,828

CLASS 104

172 S	4,031,829
223	4,031,830

CLASS 106

1	4,032,350
39.6	4,032,351
78	4,032,352
90	4,032,353
260	4,032,354
273 N	4,032,355
287 R	4,032,356
288 Q	4,032,357
311	4,032,358

CLASS 108

159	4,031,831

CLASS 111

4	4,031,832
7.1	4,031,833
85	4,031,834

CLASS 112

76	4,031,835

CLASS 113

1 F	4,031,836
121 C	4,031,837

CLASS 114

1	4,031,838
51	4,031,840
67 A	4,031,841
104	Re.29,279
144 C	4,031,842
247	4,031,843
270	4,031,839

CLASS 115

12 R	4,031,844
39	4,031,846

CLASS 116

34 R	4,031,845
65	4,031,847
114 AH	4,031,848
124 L	4,031,849
135	4,031,850

CLASS 118

49.1	4,031,851
52	4,031,852
264	4,031,853
641	4,031,854

CLASS 119

2	4,031,855
51 R	4,031,856
56 R	4,031,857
103	4,031,858
106	4,031,859

CLASS 122

240 B	4,031,860
327	4,031,861
421	4,031,862
479 R	4,031,863

CLASS 123

1 A	4,031,864
	4,031,865
32 EB	4,031,866
32 ST	4,031,867
78 B	4,031,868
117 A	4,031,869
119 A	4,031,871
	4,031,873
119 F	4,031,872
119 R	4,031,870
134	4,031,874
141	4,031,875
	4,031,876
195 A	4,031,877

CLASS 125

21	4,031,878

CLASS 126

271	4,031,879
	4,031,880
	4,031,881

CLASS 128

2.05 R	4,031,884
2.08	4,031,885
2.1 B	4,031,883
2.1 R	4,031,882
130	4,031,886
142 R	4,031,887
145 A	4,031,888
214 R	4,031,891
215	4,031,889
	4,031,890
218 F	4,031,893
218 M	4,031,892
268	4,031,894
272.1	4,031,895

276 4,031,896
286 4,031,897
303.1 4,031,898
419 PS 4,031,899
493 4,031,900

CLASS 130

27 T 4,031,901

CLASS 131

17 R 4,031,902
109 B 4,031,903
173 4,031,904
4,031,905
4,031,906

CLASS 132

40 4,031,907
91 4,031,908
4,031,909

CLASS 134

3 4,032,359
4,032,360
19 4,032,361
38 4,032,362
167 C 4,031,910

CLASS 136

211 4,032,363

CLASS 137

3 4,031,911
5 4,031,912
170.1 4,031,913
247.51 4,031,914
529 4,031,915
561 A 4,031,916
613 4,031,917
625.23 4,031,918
625.37 Re.29,280
799 4,031,919

CLASS 138

31 4,031,920
140 4,031,921

CLASS 139

11 4,031,922
97 4,031,923
336 4,031,924
429 4,031,925
435 4,031,926
436 4,031,927
452 4,031,928

CLASS 141

207 4,031,930

CLASS 144

83 4,031,931
117 R 4,031,932
198 R 4,031,933
218 4,031,934

CLASS 148

1.5 4,032,364
12 R 4,032,365
31.5 4,032,366
38 4,032,367
134 4,032,368
143 4,032,369
171 4,032,370
4,032,371
175 4,032,372
4,032,373

CLASS 149

19.8 4,032,374
41 4,032,375
60 4,032,376
105 4,032,377

CLASS 151

37 4,031,936
41.76 4,031,935

CLASS 152

9 4,031,937
209 R 4,031,938
213 R 4,031,939
362 R 4,031,940

CLASS 156

49 4,032,380
51 4,032,381
73.2 4,032,382
79 4,032,383
137 4,032,384
252 4,032,385
475 4,032,386
497 4,032,387
568 4,032,388
601 4,032,389
608 4,032,390
645 4,032,378
659 4,032,379

CLASS 157

1.17 4,031,941

CLASS 159

47 R 4,032,391

CLASS 160

103 4,031,942
330 4,031,943
331 4,031,944

CLASS 162

155 4,032,392
159 4,032,393
164 R 4,032,394

CLASS 164

72 4,031,945
89 4,031,946
114 4,031,947
281 H 4,031,948
283 M 4,031,949

CLASS 165

31 4,031,950
103 4,031,951
104 S 4,031,952
166 4,031,953

CLASS 166

117.5 4,031,954
183 4,031,955
261 4,031,956
264 4,031,957
270 4,031,958
307 4,031,959
317 4,031,960

CLASS 169

47 4,031,961

CLASS 171

8 4,031,962

CLASS 172

4 4,031,963
9 4,031,964
311 4,031,965
794 4,031,966
795 4,031,967
801 4,031,968

CLASS 174

52 PE 4,032,706
52 R 4,032,707
84 R 4,032,708

CLASS 175

65 4,031,969
103 4,031,970
107 4,031,971
263 4,031,972
320 4,031,973
334 4,031,974

CLASS 176

19 LD 4,032,395
38 4,032,396
4,032,397
43 4,032,398
62 4,032,399
67 4,032,400
86 R 4,032,401
87 4,032,402

CLASS 178

50 4,032,709

CLASS 179

1 SA 4,032,710
1.5 B 4,032,711
6 R 4,032,712
4,032,713
15 A 4,032,720
15 AA 4,032,718
15 AS 4,032,719
15 BA 4,032,714
15 BF 4,032,716
15 BT 4,032,715
4,032,717
18 BB 4,032,722
18 ES 4,032,721
41 A 4,032,723
99 4,032,724
146 R 4,032,725
170 G 4,032,726
178 4,032,727

CLASS 180

6.48 4,031,975
14 R 4,031,976
77 R 4,031,977
91 4,031,978

CLASS 181

69 4,031,979

CLASS 182

103 4,031,980
153 4,031,981

CLASS 187

8.59 4,031,982

CLASS 188

32 4,031,983
59 4,031,984
71.9 4,031,985
72.4 4,031,986
75 4,031,987
250 B 4,031,988
299 4,031,989

CLASS 191

63 4,031,990

CLASS 194

1 R 4,031,991

CLASS 195

31 R 4,032,403
51 S 4,032,408
80 R 4,032,404
82 4,032,405
103.5 R 4,032,406
127 4,032,407

CLASS 197

1 R 4,031,992
6.6 4,031,993
70 4,031,994
138 A 4,031,995
176 4,031,996

CLASS 198

301 4,031,997
365 4,031,998
418 4,031,999
428 4,032,000
711 4,032,001
808 4,032,002
855 4,032,003

CLASS 200

5 A 4,032,728
4,032,729
11 DA 4,032,730
16 B 4,032,731
50 A 4,032,732
61.45 R 4,032,733
67 DA 4,032,734
68 4,032,735
147 R 4,032,736
148 R 4,032,737
157 4,032,738
283 4,032,739

CLASS 202

158 4,032,410
248 4,032,409

CLASS 203

14 4,032,411
22 4,032,412

CLASS 204

14 N 4,032,413
15 Re.29,284
4,032,414
78 4,032,415
79 4,032,416
98 4,032,417
130 4,032,418
157.1 R 4,032,419
181 4,032,420
196 4,032,421
224 R 4,032,422
254 4,032,423
258 4,032,424
261 4,032,425
268 4,032,426
283 4,032,427
294 4,032,653

CLASS 206

39.6 4,032,004
45.14 4,032,005
45.19 4,032,006
173 4,032,007
321 4,032,009
345 4,032,010
379 4,032,008
386 4,032,011
574 4,032,012

CLASS 208

8 4,032,428
10 4,032,429
39 4,032,430
62 4,032,431
70 4,032,432
112 4,032,433
139 4,032,434
216 4,032,435

CLASS 209

1 4,032,436
17 4,032,437

CLASS 210

4,032,439
19 4,032,438
23 H 4,032,440
63 R 4,032,441
82 4,032,442
4,032,443
86 4,032,444
103 4,032,445
152 4,032,446
168 4,032,447
170 4,032,448
173 4,032,449
230 4,032,450
232 4,032,451
243 4,032,452
266 4,032,453
323 R 4,032,454
435 4,032,455
474 4,032,456
489 4,032,457

CLASS 211

13 4,032,013
49 R 4,032,014

CLASS 212

49 4,032,016

CLASS 213

61 4,032,017

CLASS 214

1 BB 4,032,018
4,032,020
1 QG 4,032,019
8.5 C 4,032,022
8.5 F 4,032,021
16.4 R 4,032,023
16.6 4,032,027
35 R 4,032,024
138 R 4,032,025
152 4,032,026
767 4,032,015

CLASS 215

217 4,032,028
256 4,032,029

CLASS 219

10.77 4,032,740
69 V 4,032,741
99 4,032,742
121 LM 4,032,743
121 P 4,032,744
203 4,032,745
216 4,032,746
222 4,032,747
275 4,032,748
442 4,032,749
464 4,032,750
538 4,032,751
541 4,032,752

CLASS 220

3.8 4,032,030
85 R 4,032,031
94 R 4,032,032
266 4,032,034
318 4,032,035
324 4,032,036
335 4,032,037

CLASS 221

71 4,032,038
75 4,032,039

CLASS 222

1 4,032,040
14 4,032,041
20 4,032,042
92 4,032,043
135 4,032,044
146 HE 4,032,045
4,032,046
183 4,032,047
185 4,032,048
238 4,032,049
284 4,032,050
492 4,032,051

CLASS 223

46 4,032,052

CLASS 224

29 B 4,032,054
45 AB 4,032,053

CLASS 226

76 4,032,055
154 4,032,056

CLASS 228

56 4,032,057
180 A 4,032,058
183 4,032,059
200 4,032,033

CLASS 229

14 BA 4,032,060
17 R 4,032,061
20 4,032,062
23 C 4,032,063
55 4,032,064
69 4,032,065

CLASS 233

26 4,032,066

CLASS 235

61.6 M 4,032,753
78 R 4,032,754
92 CC 4,032,755
92 PB 4,032,756
150.2 4,032,757
4,032,758
150.25 4,032,759
151 4,032,760
151.3 4,032,761
152 4,032,762
4,032,763
4,032,764
153 AM 4,032,765
153 AS 4,032,766
197 4,032,768

CLASS 236

34.5 4,032,067
4,032,068
46 R 4,032,069
92 B 4,032,070
101 E 4,032,071

CLASS 239

11 4,032,072
142 4,032,073
684 4,031,929
685 4,032,074

CLASS 240

1.3 4,032,769
1.4 4,032,771
4 4,032,770
6.45 R 4,032,772
10.6 R 4,032,773
73 LD 4,032,774
73 R 4,032,775

CLASS 241

45 4,032,075

CLASS 242

25 A 4,032,076
55.2 4,032,077
77.2 4,032,078
85.1 4,032,079
107.4 A 4,032,080
107.4 B 4,032,081

CLASS 243

19 4,032,082

CLASS 244

17.13 4,032,083
17.23 4,032,084
30 4,032,085
4,032,086
100 A 4,032,088
123 4,032,089
134 C 4,032,090
135 R 4,032,091
137 R 4,032,092
180 4,032,093
194 4,032,094
214 4,032,087

CLASS 246

442 4,032,095

CLASS 248

73 4,032,096
146 4,032,097
165 4,032,098
188.2 4,032,099
211 4,032,100
225.4 4,032,101
318 4,032,102
421 4,032,103

CLASS 249

114 4,032,104
134 4,032,105

CLASS 250

201 4,032,776
214 B 4,032,777
237 G 4,031,595
266 4,032,778
4,032,779
4,032,780
4,032,781
292 4,032,782
333 4,032,783
355 4,032,784
358 T 4,032,785
373 4,032,786
402 4,032,787
414 4,032,788
445 T 4,032,789
480 4,032,790
483 4,032,791

CLASS 251

144 4,032,106
296 4,032,107
306 4,032,108

CLASS 252

8.55 B 4,032,460
46.7 4,032,461
49.7 4,032,462
51.5 A 4,032,459
62.1 L 4,032,463
89 R 4,032,464
135 4,032,465
136 4,032,466
162 4,032,467
182 4,032,468
4,032,469
299 4,032,470
301.4 R 4,032,471
313 R 4,032,472
358 4,032,473
439 4,032,475
441 4,032,474
444 4,032,476
501 4,032,477
522 4,032,478

CLASS 254

69 4,032,109
76 4,032,110
77 4,032,111
108 4,032,112
138 4,032,113

CLASS 259

4 R 4,032,114
7 4,032,115
69 4,032,116
108 4,032,117
122 4,032,118

CLASS 260

2 A 4,032,479
2 EN 4,032,480
2.2 R 4,032,482
2.5 AJ 4,032,484
2.5 AM 4,032,483
2.5 AN 4,032,485
2.5 FP 4,032,481
4 AR 4,032,486
17 R 4,032,487
17.4 GC 4,032,488
27 BB 4,032,489
28 P 4,032,490
28.5 A 4,032,492
4,032,493
28.5 AS 4,032,491
29.1 SB 4,032,494
29.6 F 4,032,495
29.6 R 4,032,497
29.6 TA 4,032,496
30.6 R 4,032,498
33.4 SB 4,032,499
33.6 AQ 4,032,500
4,032,501
37 SB 4,032,502
40 P 4,032,503
42.18 4,032,504
45.75 B 4,032,509
45.75 R 4,032,507
4,032,508
45.8 N 4,032,505
45.85 S 4,032,510
45.9 R 4,032,506
46.5 R 4,032,511
47 ET 4,032,512
47 UA 4,032,513
51 EP 4,032,514
70 R 4,032,515
77.5 AA 4,032,516
78 R 4,032,517
79.3 M 4,032,518
239 A 4,032,519
240 R 4,032,520
243 C 4,032,521
250 BN 4,032,522
256.4 C 4,032,524
256.4 N 4,032,523
268 H 4,032,526
268 TR 4,032,525
287 P 4,032,527
289 R 4,032,528
293.54 4,032,529
293.56 4,032,530
293.64 4,032,531
294.9 4,032,532
302 D 4,032,533
306.7 C 4,032,534

308 R 4,032,535
309.2 4,032,536
326.12 R 4,032,537
327 M 4,032,538
331 4,032,539
340.5 4,032,540
340.9 4,032,541
343.2 F 4,032,543
343.2 R 4,032,544
4,032,545
343.6 4,032,542
347.2 4,032,546
396 N 4,032,547
396 R 4,032,548
404.5 4,032,549
410.6 4,032,550
412.4 4,032,551
414 4,032,552
448 R 4,032,553
448.2 E 4,032,557
448.8 R 4,032,554
449 M 4,032,556
465 D 4,032,555
465 H 4,032,558
465.5 R 4,032,559
473 A 4,032,561
473 G 4,032,560
473 S 4,032,562
475 R 4,032,563
481 R 4,032,564
4,032,565
484 R 4,032,566
519 4,032,567
520 A 4,032,568
533 C 4,032,569
533 R 4,032,570
558 A 4,032,571
561 N 4,032,572
562 N 4,032,573
570 D 4,032,574
570.6 4,032,575
594 4,032,577
601 R 4,032,578
610 D 4,032,605
617 R 4,032,579
618 D 4,032,580
621 B 4,032,581
632 D 4,032,582
635 D 4,032,458
637 R 4,032,583
652.5 R 4,032,584
666 A 4,032,585
673 4,032,586
673.5 4,032,587
676 R 4,032,588
683.15 D 4,032,590
683.3 4,032,589
683.65 4,032,591
827 4,032,592
835 4,032,593
837 PV 4,032,594
857 PE 4,032,595
862 4,032,596
876 R 4,032,597
878 R 4,032,598
885 4,032,599
897 B 4,032,600
969 4,032,601
972 4,032,602
990 4,032,603

CLASS 261

111 4,032,604

CLASS 264

22 4,032,606
29.3 4,032,607
46.6 4,032,608
53 4,032,609
107 4,032,610
244 4,032,611
259 4,032,612

CLASS 266

158 4,032,119
159 4,032,120
163 4,032,121
169 4,032,122
186 4,032,123
218 4,032,124

CLASS 267

63 A 4,032,125
116 4,032,126
151 4,032,127
159 4,032,128
179 4,032,129

CLASS 269

8 4,032,130

CLASS 270

53 4,032,131
58 4,032,132
68 A 4,032,133

CLASS 271

5 4,032,134
116 4,032,135
160 4,032,136
164 4,032,137

CLASS 272

33 R 4,032,138
56.5 SS 4,032,139
70.1 4,032,140

CLASS 273

1 L 4,032,141
29 A 4,032,142
72 R 4,032,143
86 R 4,032,144
90 4,032,145
105.6 4,032,146
106.5 R 4,032,147
120 R 4,032,148
123 R 4,032,149
126 R 4,032,150
131 B 4,032,151
131 BA 4,032,152
134 AT 4,032,153
4,032,154
156 4,032,155
164 4,032,156
183 E 4,032,157

CLASS 274

23 A 4,032,158

CLASS 277

145 4,032,159

CLASS 279

1 H 4,032,161
1 K 4,032,160
4 4,032,162
37 4,032,163

CLASS 280

33.99 A 4,032,164
79.3 4,032,165
106 T 4,032,167
204 4,032,166
279 4,032,168
405 B 4,032,169
495 4,032,170
507 4,032,171
615 4,032,172
650 4,032,173
745 4,032,174
751 4,032,175

CLASS 285

18 4,032,176
24 4,032,177
162 4,032,178

CLASS 289

18 4,032,179

CLASS 290

37 R 4,032,792
40 C 4,032,793

CLASS 292

341.16 4,032,180

CLASS 294

16 4,032,181
19 R 4,032,182
88 4,032,184
91 4,032,183
97 4,032,185

CLASS 296

100 4,032,186
102 4,032,187

CLASS 297

232 4,032,188
352 4,032,189
353 4,032,190
440 4,032,191

CLASS 298

23 A 4,032,192

CLASS 299

4 4,032,193
4,032,194
19 4,032,195

CLASS 300

21 4,032,196

CLASS 303

96 4,032,197
116 4,032,200

CLASS 307

205 4,032,795
218 4,032,796
227 4,032,797
233 R 4,032,798
264 4,032,799
296 A 4,032,800
311 4,032,801
4,032,802
326 4,032,794

CLASS 308

72 4,032,203
73 4,032,199
76 4,032,198
207 R 4,032,201
238 4,032,202

CLASS 310

8.1 4,032,803
8.3 4,032,804
15 4,032,805
50 4,032,806
178 4,032,807

CLASS 312

7 R 4,032,204

CLASS 313

178 4,032,808
344 4,032,809
360 4,032,810
417 4,032,811
487 4,032,812
492 4,032,813
4,032,814

CLASS 315

14 4,032,815
73 4,032,816
149 4,032,817
169 R 4,032,818
398 4,032,819

CLASS 318

45 4,032,824
139 4,032,825
314 4,032,826
696 4,032,827

CLASS 320

39 4,032,828
61 4,032,829

CLASS 322

86 4,032,835

CLASS 323

6 4,032,836
4,032,837
19 4,032,838
4,032,839
44 F 4,032,959
48 4,032,840

CLASS 324

15 4,032,842
60 CD 4,032,841
96 4,032,843

CLASS 325

15 4,032,844
16 4,032,845
54 4,032,846
323 4,032,847
325 4,032,848
446 4,032,849
4,032,850
451 4,032,851

CLASS 328

167 4,032,852

CLASS 330

2 4,032,853
26 Re.29,286
29 4,032,854
31 4,032,855
69 4,032,856
151 4,032,857

CLASS 331

9 4,032,858
53 4,032,859
63 4,032,860
94.5 C 4,032,861
94.5 D 4,032,863
94.5 P 4,032,862
116 R 4,032,864

CLASS 333

21 R 4,032,865
28 R 4,032,866
70 T 4,032,867
98 P 4,032,868

CLASS 335

132 4,032,869
195 4,032,870
202 4,032,871
212 4,032,872

CLASS 336

57 4,032,873
60 4,032,874

CLASS 337

70 4,032,875
75 4,032,876
148 4,032,877
228 4,032,878
278 4,032,879

CLASS 338

157 4,032,880
195 4,032,881

CLASS 339

13 4,032,205
42 4,032,206
75 M 4,032,207
88 R 4,032,208
91 R 4,032,209
98 4,032,210
99 R 4,032,211
109 4,032,212
186 M 4,032,213
218 M 4,032,214
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173 DR 4,032,904
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CLASS 427		**CLASS 428**		309	4,032,682	**CLASS 429**		**CLASS 431**		**CLASS 526**	
8	4,032,670	1	4,032,687	315	4,032,683			12	4,032,285	14	4,032,698
14	4,032,671	36	4,032,688	332	4,032,684	17	4,032,693	76	4,032,286	18	4,032,699
34	4,032,672	42	4,032,679	399	4,032,685	33	4,032,694	175	4,032,287	43	4,032,700
54	4,032,673	55	4,032,689	425	4,032,686	94	4,032,695	**CLASS 432**		88	4,032,701
126	4,032,675	119	4,032,680	426	Re.29,285	101	4,032,696	189	4,032,288	163	4,032,703
130	4,032,674	253	4,032,681	442	4,032,692	222	4,032,697	200	4,032,289	**CLASS 536**	
358	4,032,677	263	4,032,690							119	4,032,702

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D2—	378.2	244,806		186	244,820		245	244,834			244,847	D16—	6	244,851		37	244,881
	400	244,807	D7—	45	244,821	D10—	15	244,835	D13—	10	244,864	D19—	92	244,852	D29—	8	244,880
D3—	19 A	244,808		77	244,822		64	244,836		24	244,859	D22—	14	244,853	D30—	39	244,869
D4—	31	244,809		78	244,823		69	244,837			244,861	D23—	42	244,854		44	244,870
D6—	28	244,810		85	244,824	D11—	144	244,838	D14—	6	244,865		55	244,855	D34—	5 CB	244,874
	56	244,811		137	244,825		148	244,839		10	244,868		141	244,856		5 PP	244,872
		244,812			244,826	D12—	62	244,840		45	244,863	D24—	21	244,857		5 SS	244,873
		244,813		188	244,827			244,841		56	244,848		29	244,879	D48—	20 R	244,875
	71	244,814	D8—	5	244,828		70	244,842			244,849		36	244,871		24 R	244,876
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	114	244,816		350	244,831		116	244,844		73	244,877	D25—	48	244,858	D87—	2 R	244,883
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		244,818	D9—	170	244,832			244,846	D15—	112	244,850	D28—	18	244,882		3 C	244,884
	179	244,819		235	244,833												

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1 : 4,031,602	4,031,894	4,032,546	4,032,718	4,032,109	4,032,012
4,031,850	4,031,895	4,032,564	4,032,738	4,032,149	4,032,044
4,032,452	4,031,904	4,032,579	4,032,760	4,032,221	4,032,049
3 : 4,032,885	4,031,910	4,032,589	4,032,982	4,032,252	4,032,054
4 : 4,031,784	4,031,937	4,032,605	9 : Re.29,283	4,032,272	4,032,057
4,031,826	4,031,939	4,032,608	4,031,584	4,032,437	4,032,064
4,032,195	4,031,958	4,032,618	4,031,605	4,032,455	4,032,069
4,032,245	4,031,970	4,032,723	4,031,641	4,032,517	4,032,098
4,032,330	4,031,972	4,032,729	4,031,668	4,032,566	4,032,133
4,032,447	4,031,973	4,032,762	4,031,689	4,032,671	4,032,146
4,032,896	4,031,979	4,032,765	4,031,744	4,032,687	4,032,147
4,032,963	4,032,010	4,032,767	4,031,765	4,032,753	4,032,178
5 : Re.29,277	4,032,029	4,032,774	4,031,774	4,032,772	4,032,204
4,031,654	4,032,066	4,032,775	4,031,861	4,032,802	4,032,209
4,031,702	4,032,075	4,032,783	4,031,909	4,032,817	4,032,254
6 : Re.29,284	4,032,087	4,032,787	4,032,035	4,032,883	4,032,269
4,031,566	4,032,092	4,032,789	4,032,052	13 : 4,031,643	4,032,270
4,031,573	4,032,096	4,032,795	4,032,083	4,031,694	4,032,274
4,031,577	4,032,102	4,032,815	4,032,124	4,032,002	4,032,288
4,031,579	4,032,111	4,032,818	4,032,207	4,032,097	4,032,295
4,031,587	4,032,116	4,032,830	4,032,215	4,032,153	4,032,297
4,031,593	4,032,129	4,032,832	4,032,355	4,032,668	4,032,299
4,031,616	4,032,138	4,032,843	4,032,382	15 : 4,031,915	4,032,310
4,031,618	4,032,145	4,032,849	4,032,435	4,032,072	4,032,311
4,031,619	4,032,155	4,032,853	4,032,457	16 : 4,032,319	4,032,334
4,031,623	4,032,163	4,032,857	4,032,496	4,032,551	4,032,357
4,031,634	4,032,164	4,032,859	4,032,617	4,032,614	4,032,400
4,031,648	4,032,168	4,032,861	4,032,631	17 : 4,031,594	4,032,408
4,031,655	4,032,177	4,032,863	4,032,632	4,031,603	4,032,433
4,031,667	4,032,182	4,032,865	4,032,733	4,031,626	4,032,434
4,031,677	4,032,185	4,032,881	4,032,747	4,031,629	4,032,475
4,031,698	4,032,188	4,032,888	4,032,784	4,031,650	4,032,508
4,031,701	4,032,189	4,032,889	4,032,848	4,031,656	4,032,563
4,031,705	4,032,210	4,032,897	4,032,862	4,031,659	4,032,586
4,031,719	4,032,216	4,032,902	06 : 4,032,918	4,031,664	4,032,587
4,031,723	4,032,220	4,032,905	10 : 4,031,846	4,031,777	4,032,600
4,031,726	4,032,238	4,032,922	4,032,181	4,031,782	4,032,615
4,031,731	4,032,243	4,032,926	4,032,416	4,031,801	4,032,645
4,031,747	4,032,259	4,032,943	4,032,454	4,031,824	4,032,670
4,031,753	4,032,283	4,032,950	4,032,493	4,031,832	4,032,701
4,031,766	4,032,306	4,032,954	4,032,533	4,031,891	4,032,720
4,031,799	4,032,314	4,032,970	4,032,638	4,031,921	4,032,725
4,031,808	4,032,363	4,032,975	4,032,654	4,031,922	4,032,730
4,031,827	4,032,370	4,032,978	11 : 4,031,567	4,031,936	4,032,740
4,031,844	4,032,383	4,032,979	12 : 4,031,604	4,031,941	4,032,743
4,031,848	4,032,395	4,032,984	4,031,662	4,031,944	4,032,748
4,031,853	4,032,422	8 : 4,031,627	4,031,686	4,031,953	4,032,751
4,031,864	4,032,445	4,031,956	4,031,687	4,031,967	4,032,811
4,031,874	4,032,460	4,032,022	4,031,802	4,031,968	4,032,828
4,031,875	4,032,462	4,032,151	4,031,803	4,031,975	4,032,858
4,031,885	4,032,504	4,032,227	4,031,806	4,031,981	4,032,880
4,031,886	4,032,511	4,032,373	4,031,855	4,031,991	4,032,886
4,031,888	4,032,519	4,032,707	4,031,879	4,032,009	4,032,891

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54 : 4,031,997
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55 : Re.29,280
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4,032,908
4,032,959
56 : 4,031,574

DESIGN PATENTS

5	:	244,853		244,875		244,882		244,872		244,869	244,881
6	:	244,820	9 :	244,808	12 :	244,816	20 :	244,822	29 :	244,819	244,883
		244,830		244,811		244,840	24 :	244,874	34 :	244,866	41 : 244,863
		244,835		244,825	17 :	244,806	25 :	244,834		244,877	42 : 244,876
		244,841		244,826		244,824		244,854	36 :	244,817	244,878
		244,843		244,828		244,838	26 :	244,807		244,818	48 : 244,815
		244,857		244,859		244,842		244,812		244,821	244,884
		244,879		244,860		244,844		244,813		244,823	49 : 244,810
		244,880		244,861		244,856		244,829		244,827	51 : 244,850
8	:	244,836		244,871	18 :	244,885		244,858		244,831	244,867
		244,862		244,873	19 :	244,870	27 :	244,865		244,839	55 : 244,855

PLANT PATENTS

48	:	4,065	4,066	4,067	4,068	

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE

Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE

C. Marshall Dann, *Commissioner*